











FIG. 1

	Play
	Stop
	Forward
	Reverse
	Record

Player Function keys

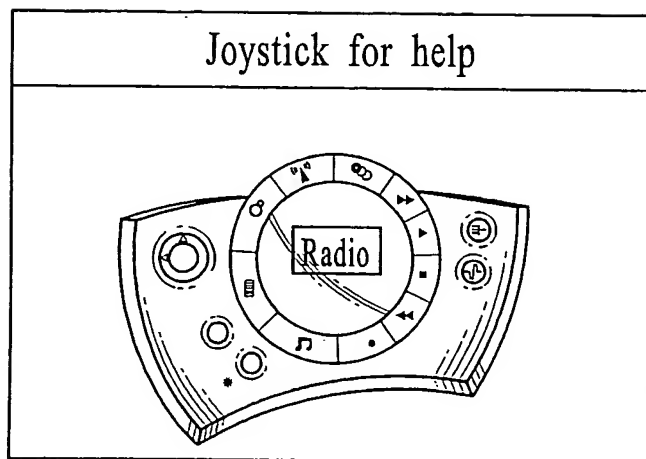
FIG. 2

	e.DJ
	V.Radio
	Songs
	Samples
	System

Mode/Direct Access keys

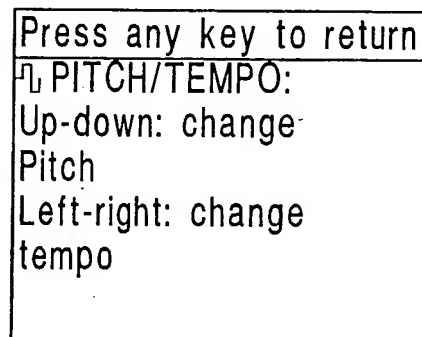
FIG. 3

FIG. 4



Home Screen

FIG. 5

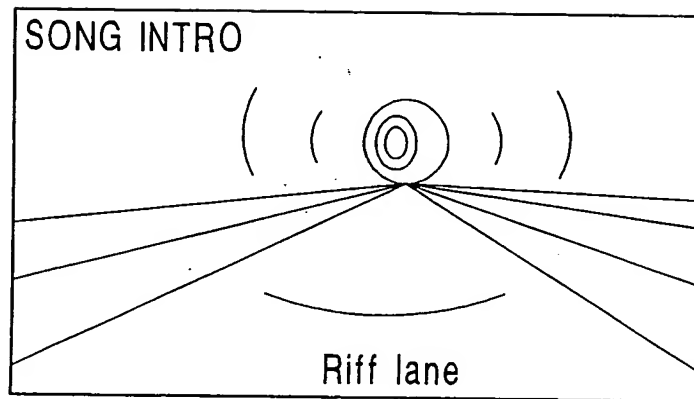


Help Screen

FIG. 6

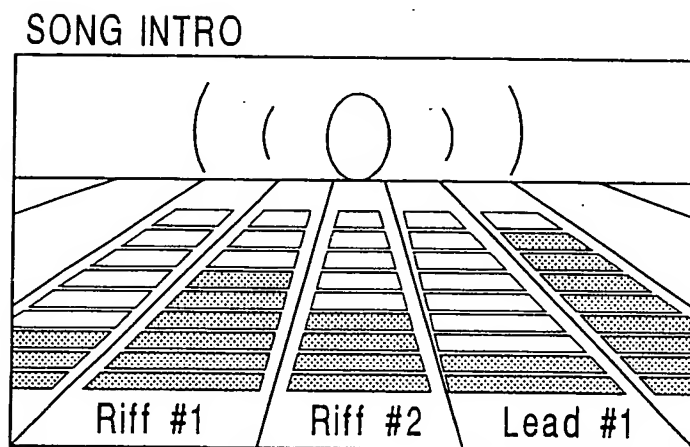


e.DJ Style Selection Screen



e.DJ I-Way Screen

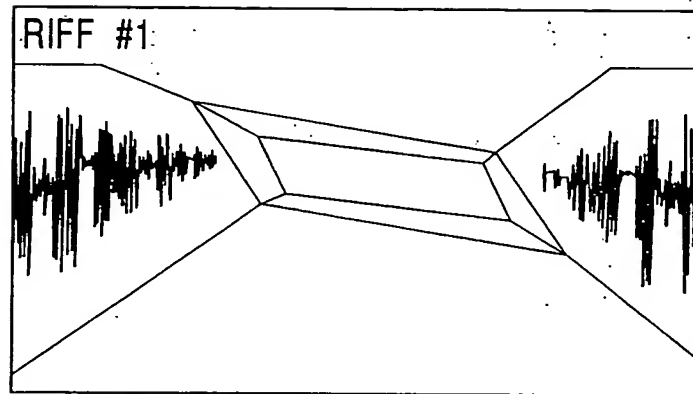
FIG. 7A



Alternate I-Way Screen

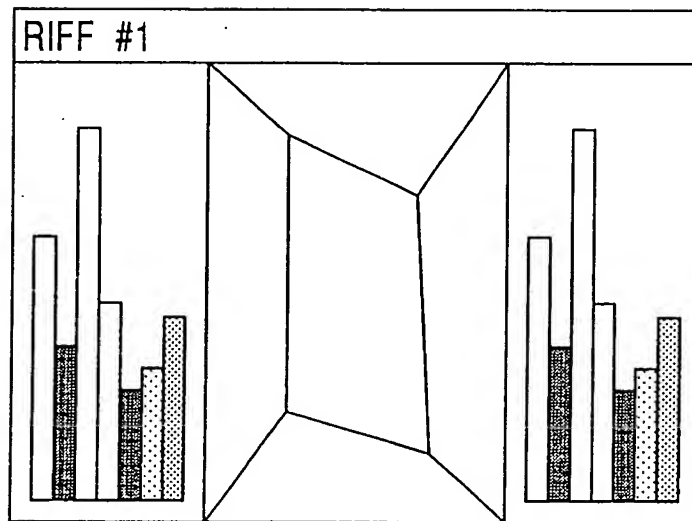
FIG. 7B

FIG. 8A

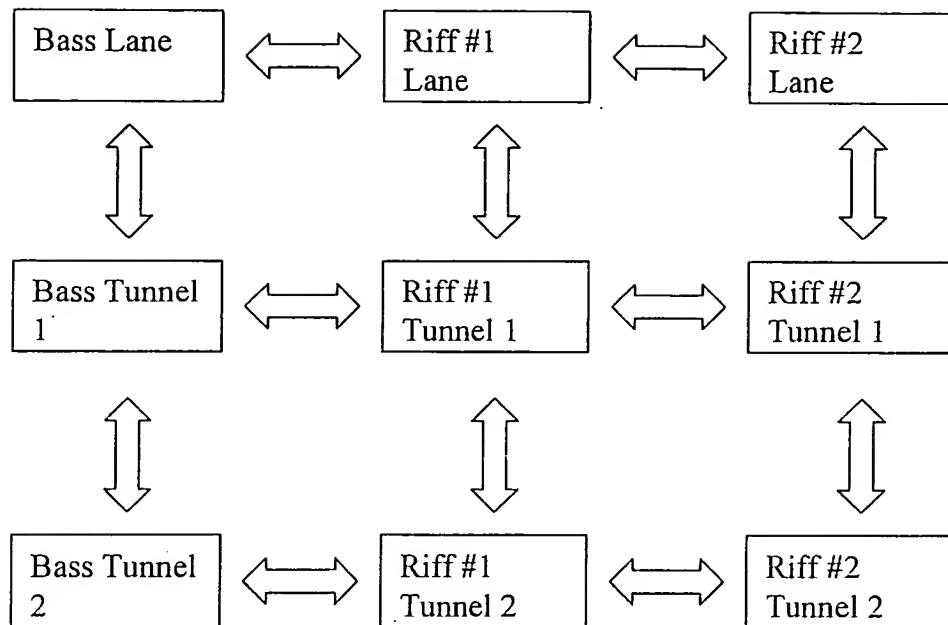


e.DJ Underground Screen

FIG. 8B



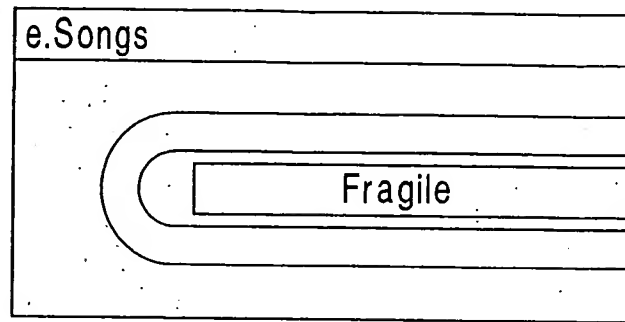
Alternate Underground Interface



Exemplary GUI Spatial Organization

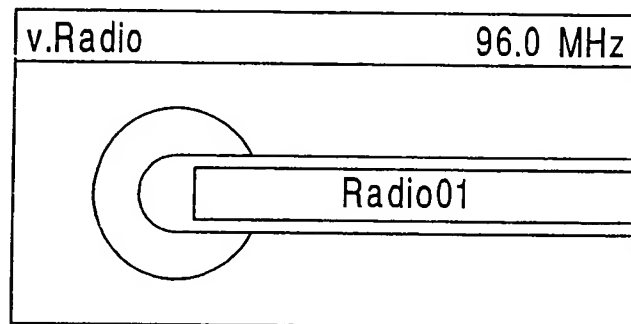
FIG. 8C

FIG. 9



Play Song Screen

FIG. 10



Play Radio Screen

FIG. 11

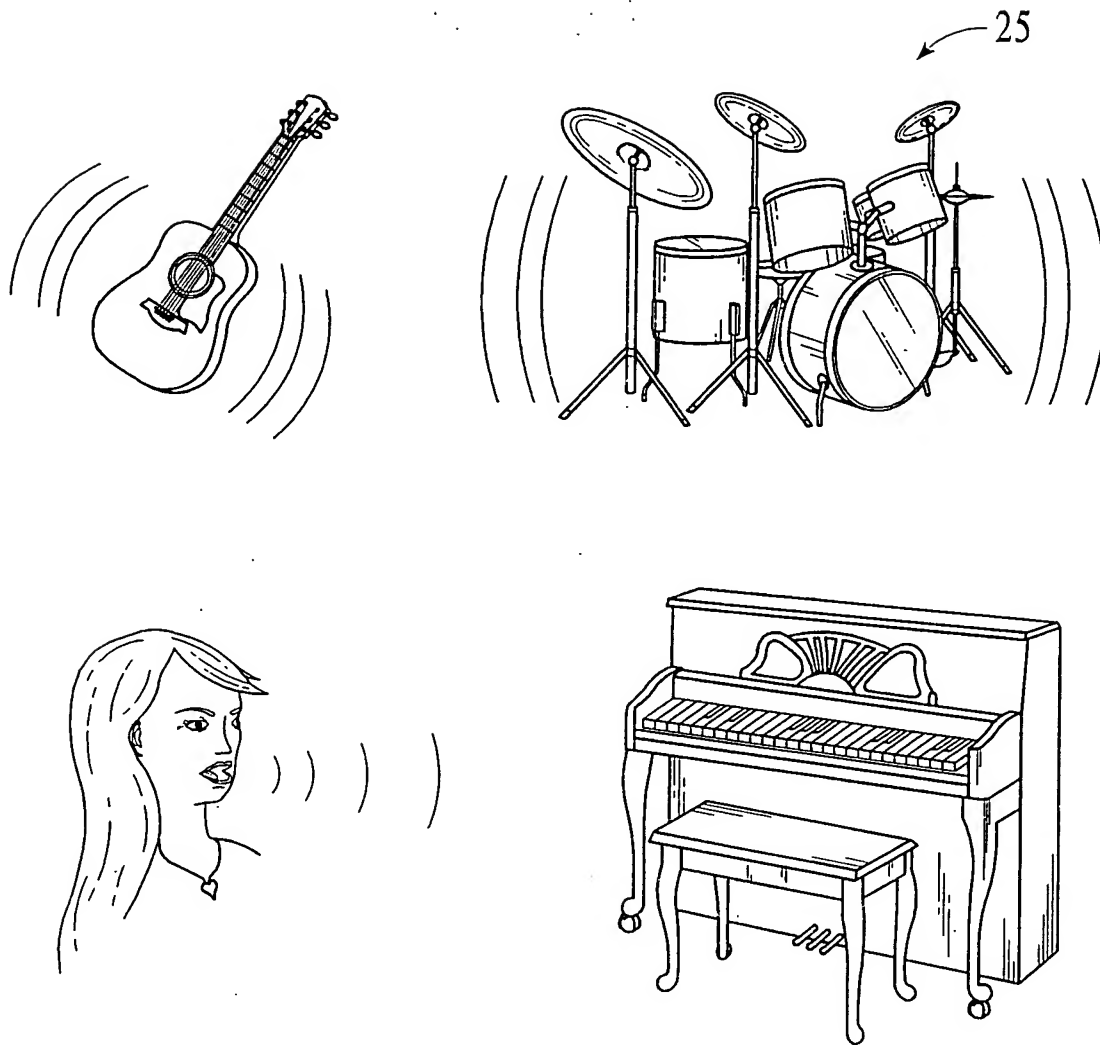
New SONGLIST001	
1	JINGLE
2	ALLNIGHT
3	FRAGILE
4	GROOVE
5	END LIST

List Edit Screen

FIG. 12

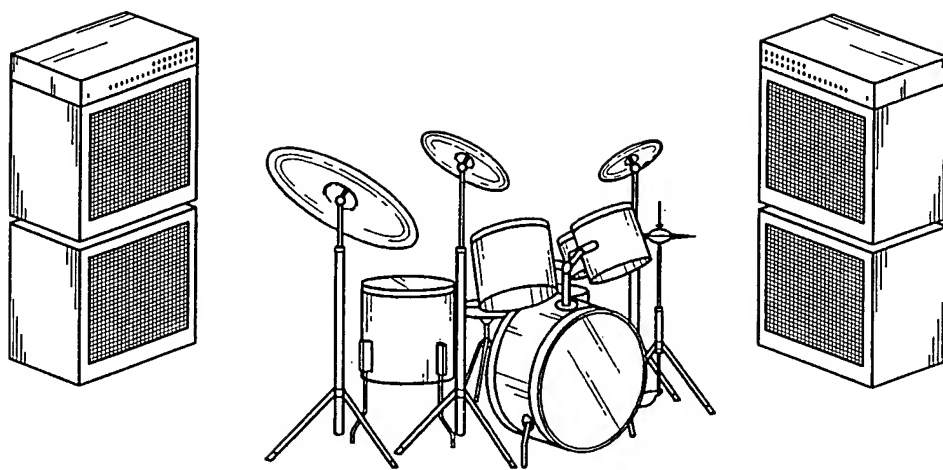
Configuration	
AUTOPLAY	OFF
POWER OFF	DISABLED
AUTOREPEAT	40 ms
EQ PRESETS	DEFAULT
STATION SEARCH	AUTO
REC FORMAT	PCM

Configuration Screen



Alternative User Interface for I-Way Mode

FIG. 13A



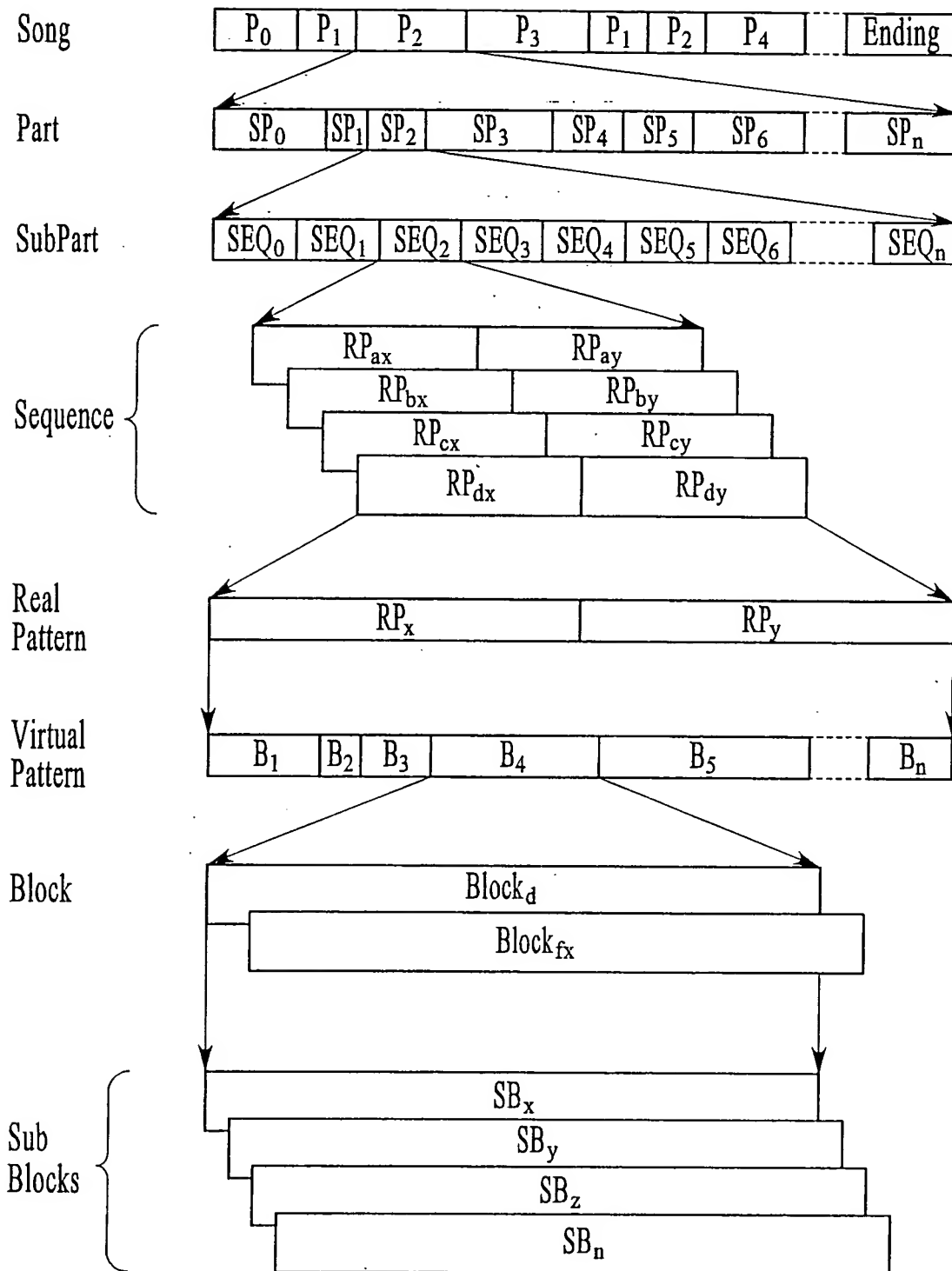
Alternative 3D Music Stage Interface

FIG. 13B

Parameter	Values	Description
AutoPlay	On/Off	If AutoPlay is On, the MadPlayer automatically starts playing the first Play list contained on a SmartMedia card when inserted.
Power Off	Disabled, 1mn to 60mn in steps of 1mn.	Auto power off delay. The MadPlayer will power off automatically after this delay if no user action is detected.
AutoRepeat	40ms to 600ms in steps of 20ms	Keyboard auto-repeat delay in milliseconds. Delay before repeating the corresponding action when a key is pressed continuously.
EQ Preset	Factory Woof Hitek Flat User	Presets for 4-band equalizer. Factory, Woof, HiTek and Flat are factory presets and fixed. User preset can be configured by the User via the System-Equalizer menu.
Mic State	On/Off	Microphone input is On or Off.
Mic Volume	0 to 31	Microphone volume.
Echo Level	0 to 127	Level of echo applied to microphone input
Echo Time	0 to 127	Microphone echo delay. 0 shortest, 127 longest.
Echo Feedbk	0 to 31	Echo feedback: 0 minimum feedback, 127 maximum feedback.
Rec Format	PCM HQFADPC M	Format used to store recorded samples: PCM: PCM, 16bits mono, 19.31kHz HQFADPCM: High Quality ADPCM
Language	English Francais Espanol	Language used for the menus.
Sort Files	By Name By Type	Criterion used to sort files when displaying a list: by name (alphabetically) or by type (songs, samples, lists...).
Sort Presets	By Name By Freq	Criterion used to sort radio presets: by name (alphabetically) or by frequency.
Product	String	Read Only. Hardware version
Release	String	Read Only. Firmware version

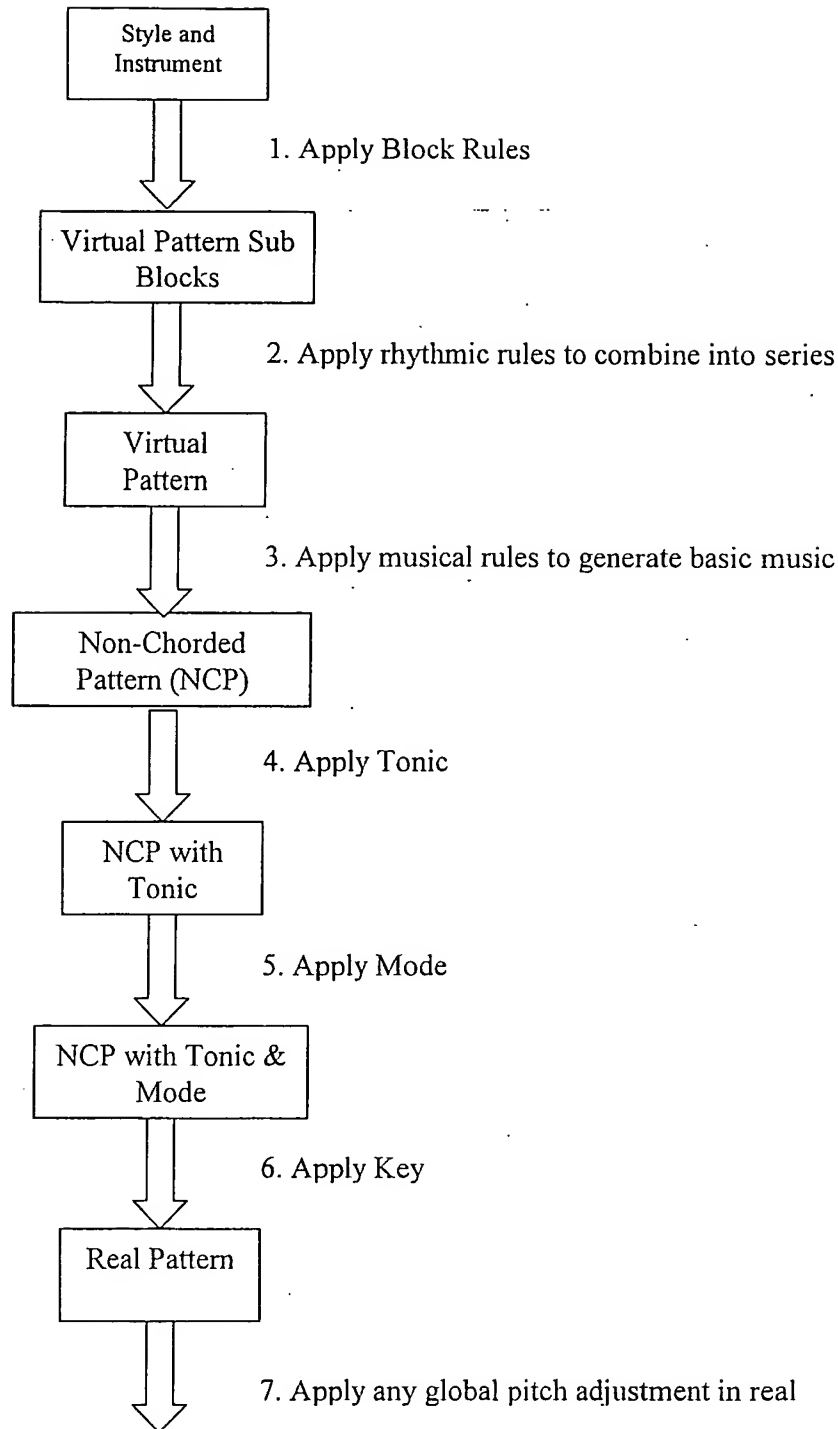
Configuration Parameters

FIG. 14



Song Structure

FIG. 15



General Musical Generation Flow

FIG. 16A

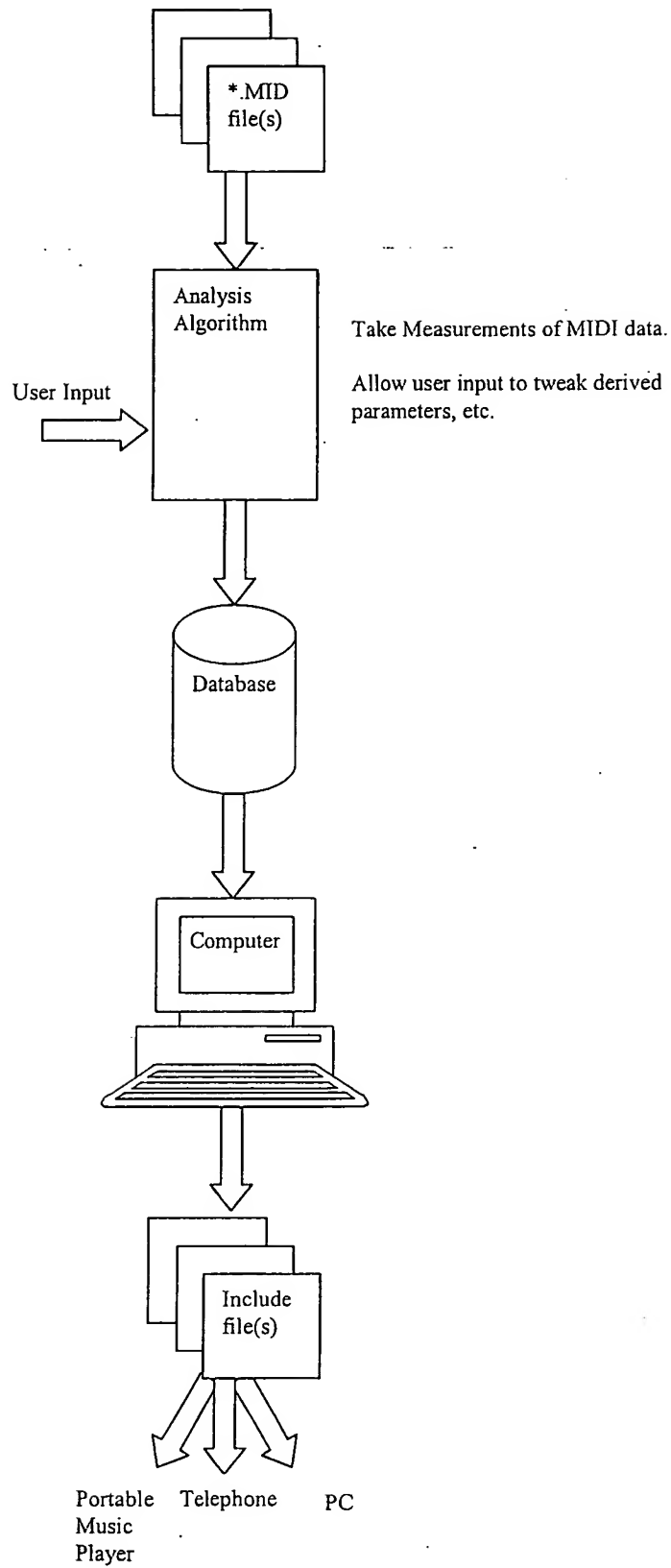


Figure 16C
Exemplary Automated Music Analysis

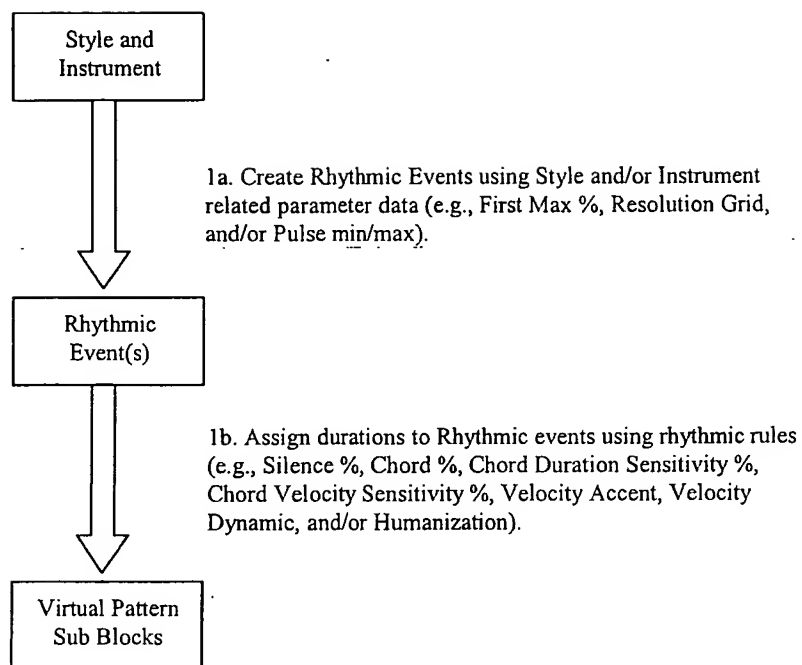
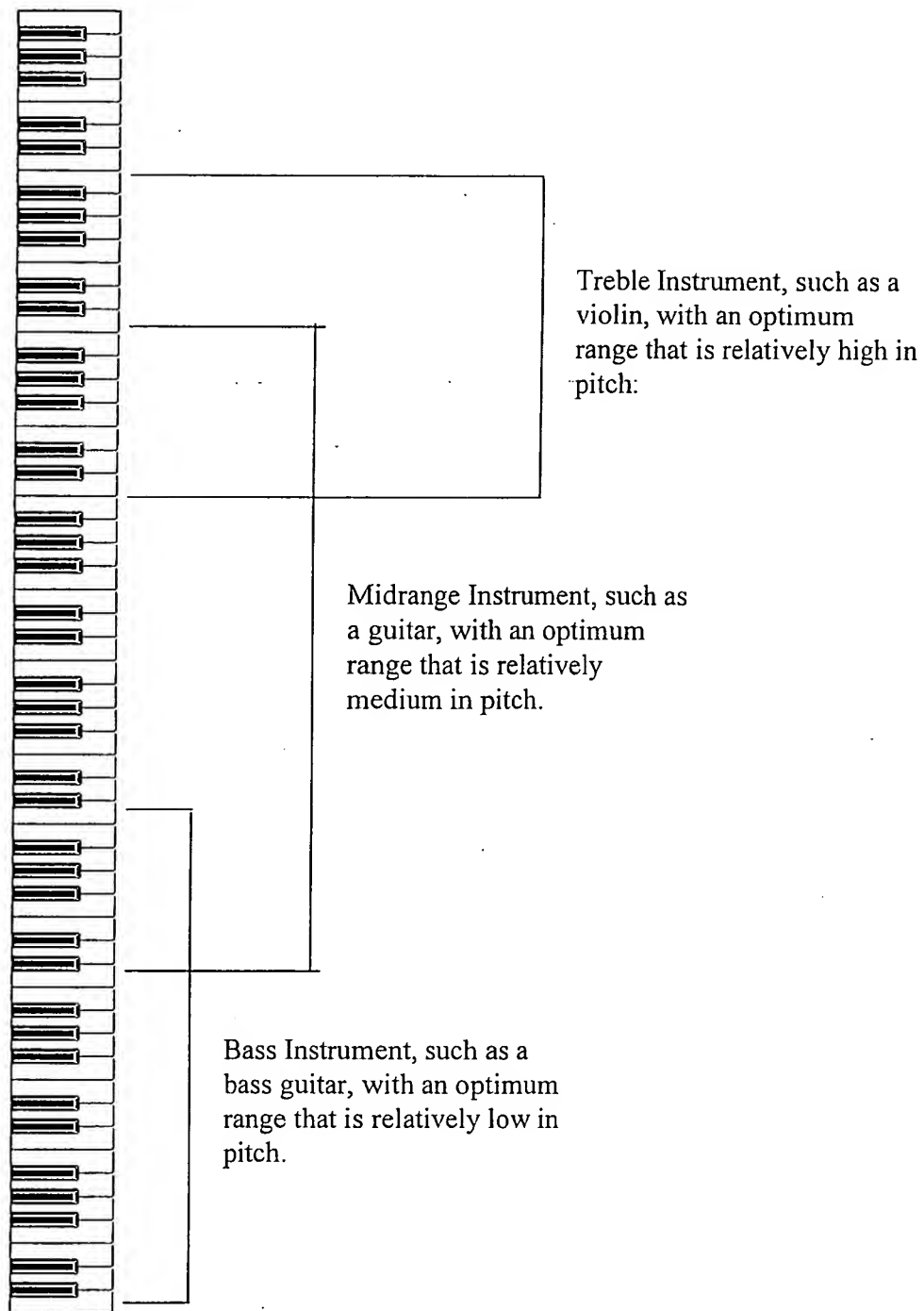


Figure 16B
Sub-Block Generation

<i>Hexadecimal Value</i>	<i>Internal Nomenclature</i>	<i>Potential Values</i>
40	Base Note	C, E, G, B
41	Magic Note 1	+1, -1, +2, -2
42	Magic Note 0	+1, -1, +2, -2, 0
43	High Note	+7
44	Last Note	C, G
45	One Before Last Note	E, G, B
46	ALC Controller <ul style="list-style-type: none">• Harmonic Note• Fixed Note	0, +2, +4, +6, -3, -5, -7 any

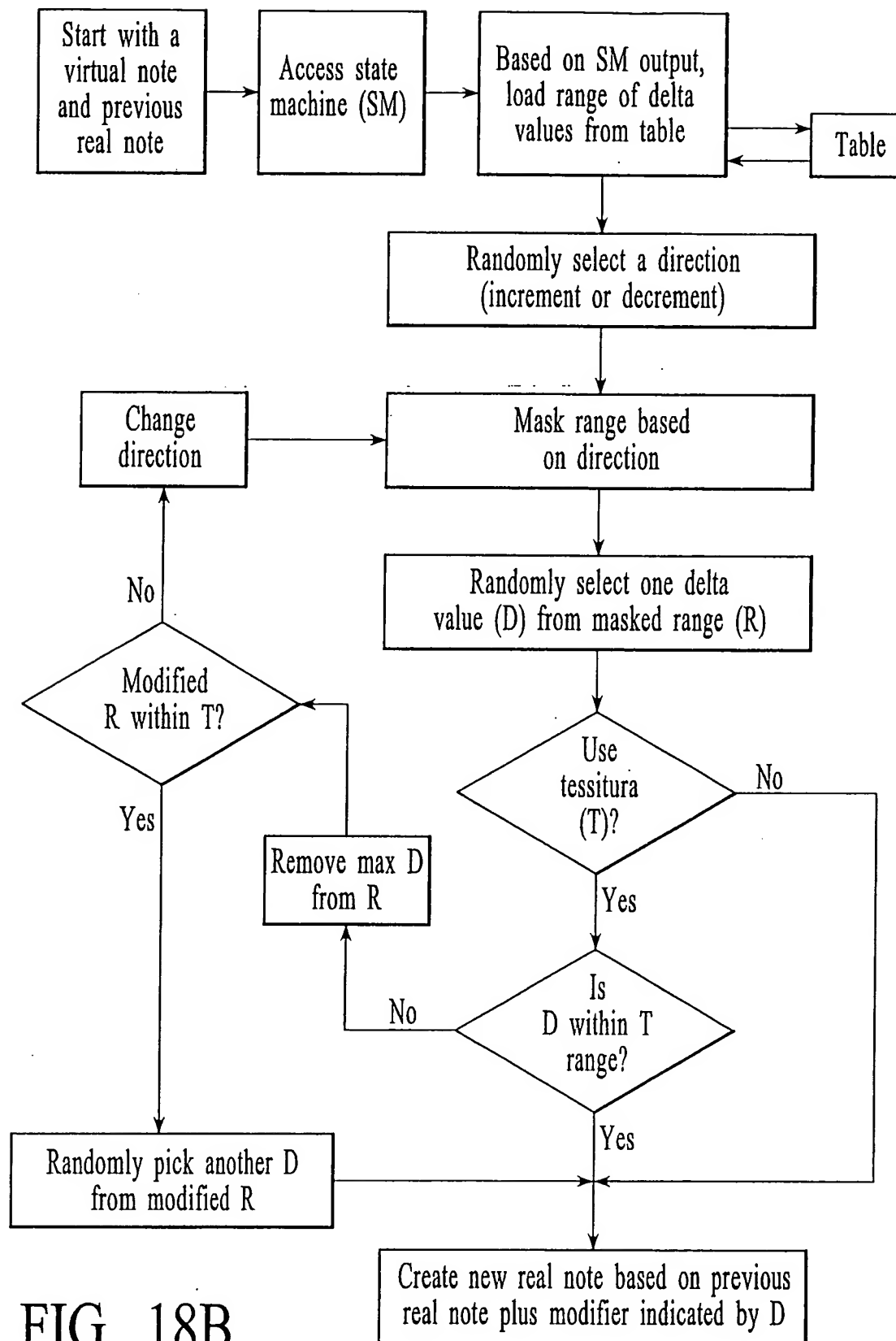
Examples of Virtual Notes/Controllers

FIG. 17



Example of Tessitura

FIG. 18A




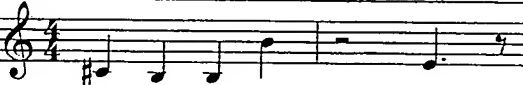
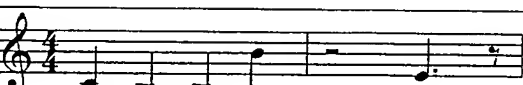
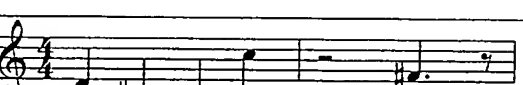


	Key			
Chord	A	C	D	G
Offset	-3	0	+2	+8

FIG. 19



Mode Type	Individual Notes											
All Notes	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
Natural	C	C	D	D	E	F	F	G	G	A	A	B
Lydian Descending	C	C	D	D	E	E	F#	G	G	A	A	B
Lydian Ascending	C	D	D	E	E	F#	F#	G	A	A	A	B

FIG. 20

	Musical Notation	Software Notation (QN=30)
Virtual Pattern Sub- Blocks		C4 = Base Note F#4 = Magic Note Type 1 D4 = Magic Note Type 0 C#4 = High Note C4 = Base Note
Virtual Pattern (VP)		00 91 30 70 1e 81 30 00 91 36 64 1e 81 36 00 91 32 7f 1e 81 32 00 91 31 72 1e 81 31 3C 91 30 64 2d 81 30
Non- Chorde d Pattern (NCP)		00 91 34 70 1e 81 34 00 91 32 64 1e 81 32 00 91 32 7f 1e 81 32 00 91 3e 72 1e 81 3e 3C 91 37 64 2d 81 37
NCP with Tonic (PwT)		00 91 31 70 1e 81 31 00 91 2f 64 1e 81 2f 00 91 2f 7f 1e 81 2f 00 91 3b 72 1e 81 3b 3C 91 34 64 2d 81 34
PwT with Mode (PwTM)		00 91 30 70 1e 81 30 00 91 2f 64 1e 81 2f 00 91 2f 7f 1e 81 2f 00 91 3b 72 1e 81 3b 3C 91 34 64 2d 81 34
Real Pattern (RP)		00 91 32 70 1e 81 32 00 91 31 64 1e 81 31 00 91 31 7f 1e 81 31 00 91 3d 72 1e 81 3d 3C 91 36 64 2d 81 36

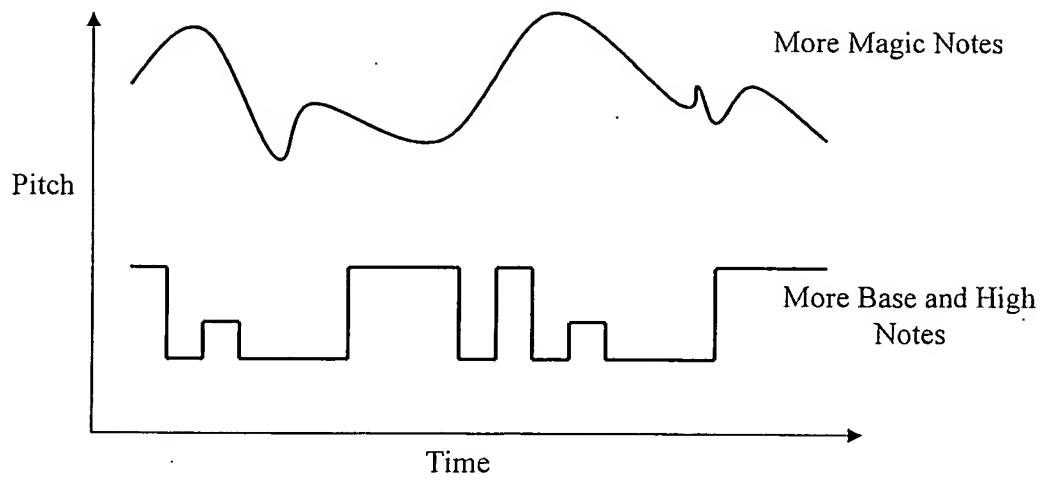
Example of VP-to-RP Flow

FIG. 21

	Rhythmic Blocks/Sub-Blocks	Conditions
Relative Rhythmic Density		<p>All variations, given:</p> <ul style="list-style-type: none"> • eighth note is smallest unit • length of 1 quarter note • all full rests are indicated separately as 'empty'
		<p>All variations, given:</p> <ul style="list-style-type: none"> • eighth note is smallest unit • length of 2 quarter notes • does not include 1 quarter note variations above

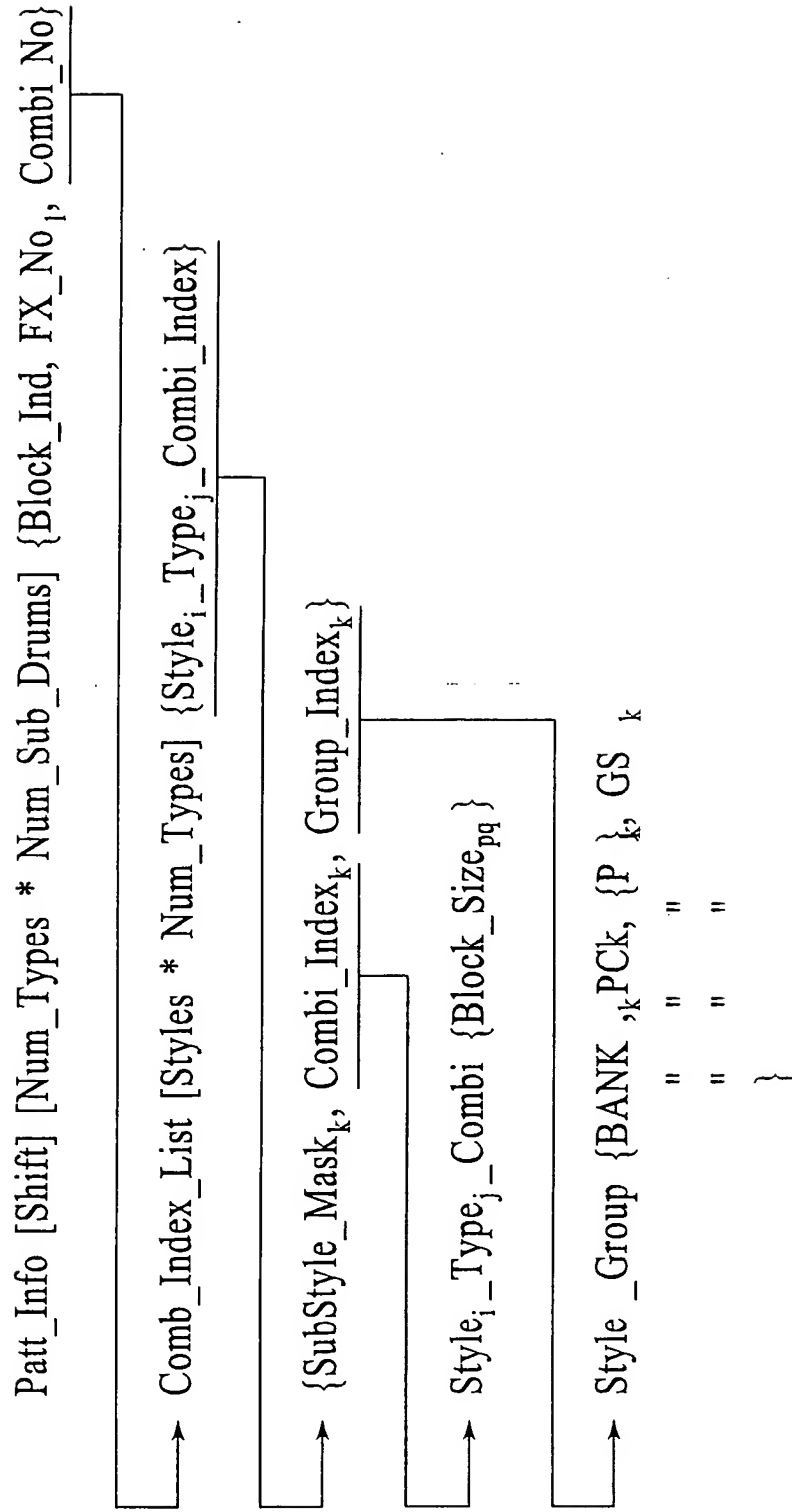
Rhythmic Variations based on Duration

FIG. 22



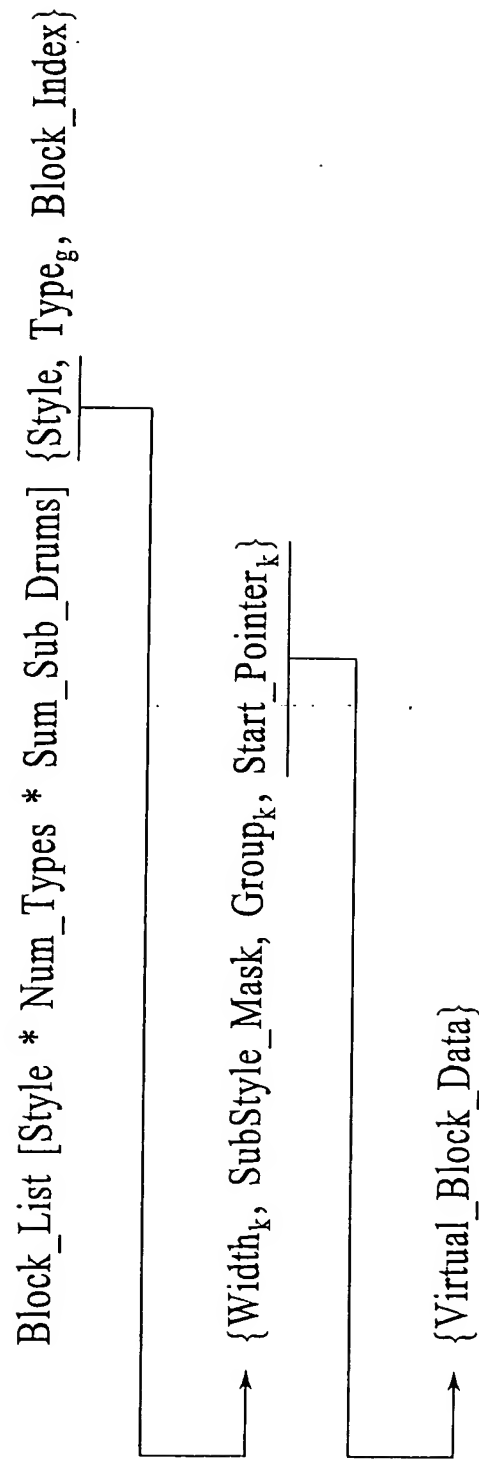
Relative Mobility of Note Pitch

FIG. 23



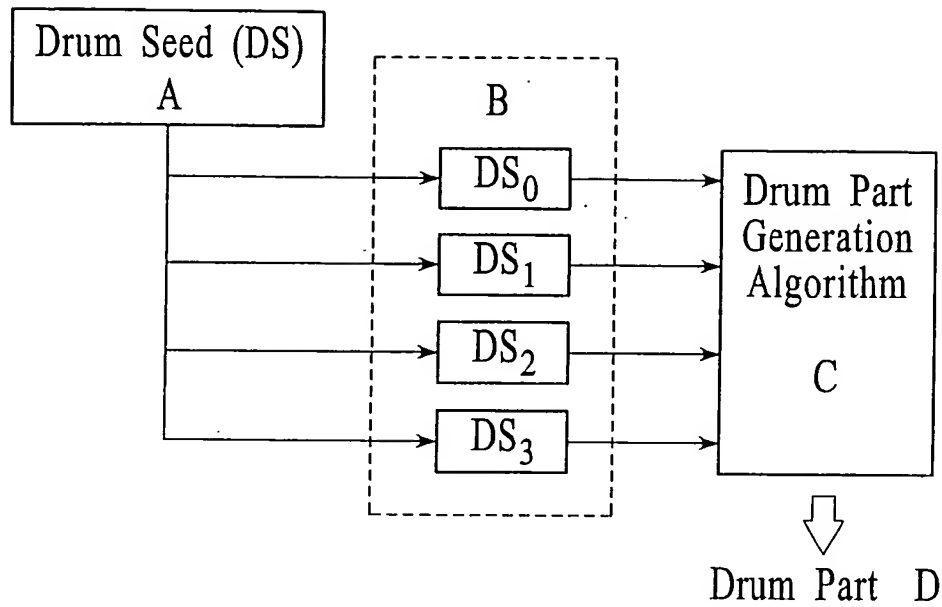
Pattern Structure Creation Example

FIG. 24



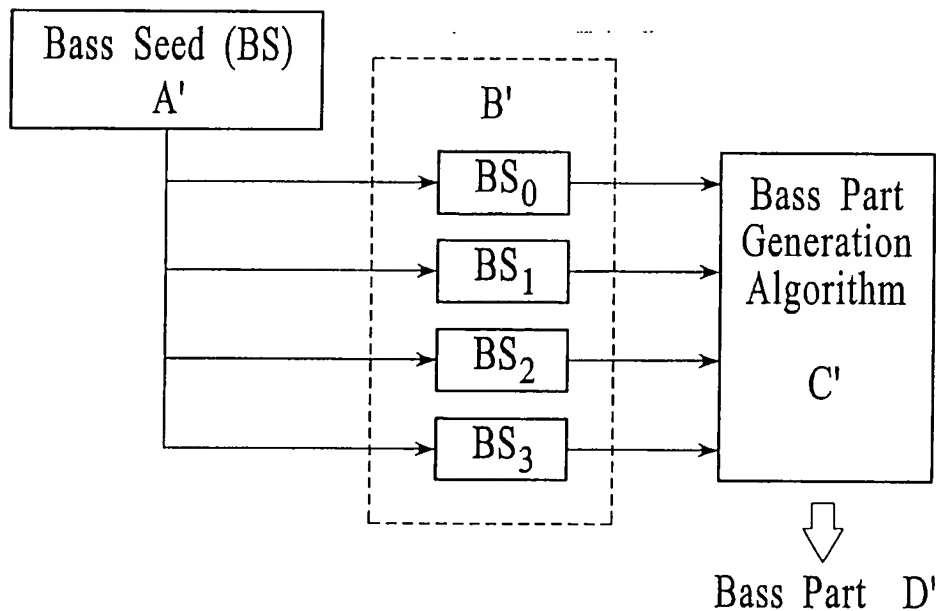
Block Structure Creation Example

FIG. 25



Pseudo-Random Number Implementation 1

FIG. 26



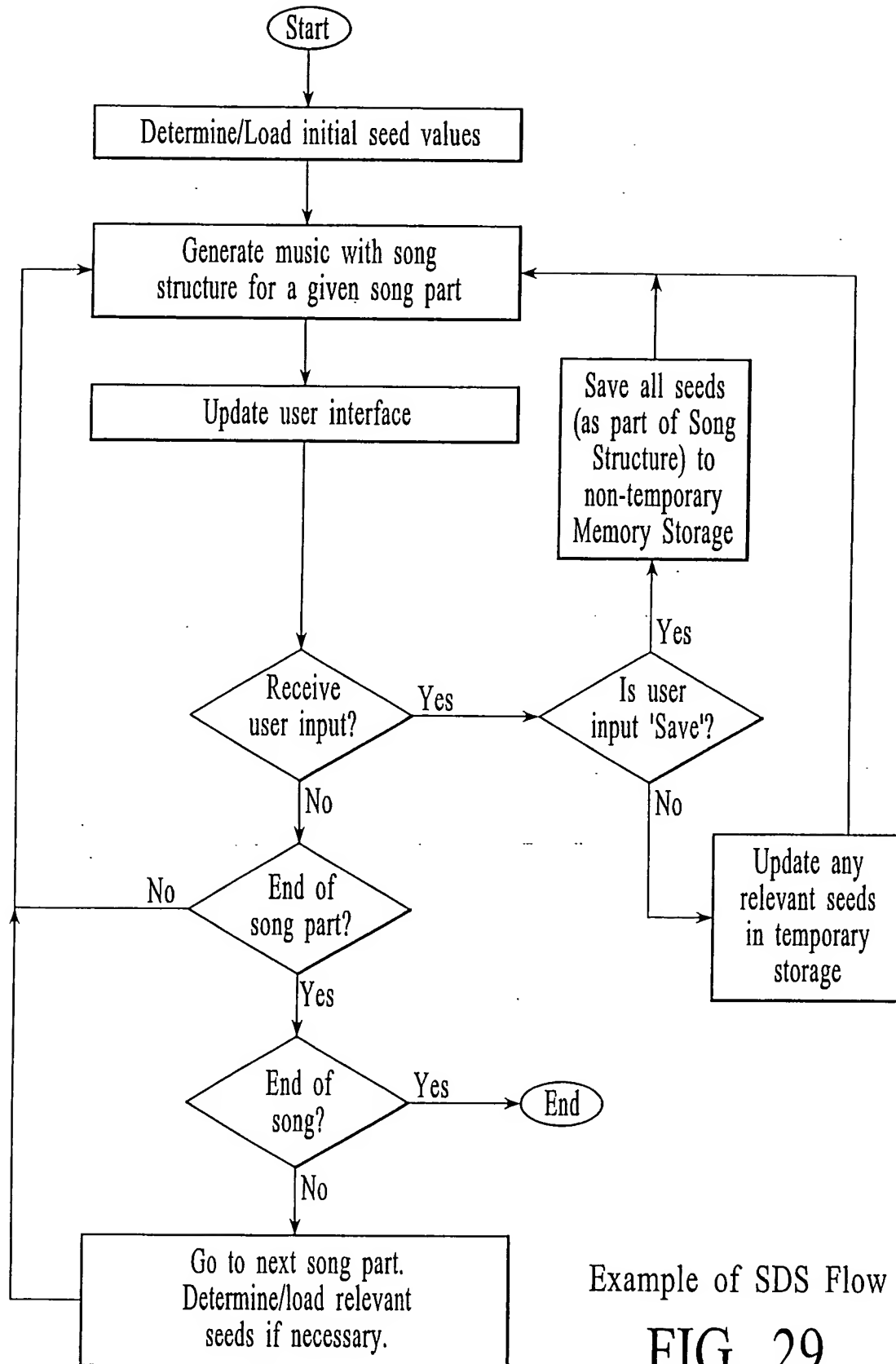
Pseudo-Random Number Implementation 2

FIG. 27

Application Revision	Firmware/application version used to generate the data structure
Style, SubStyle	The style and/or substyle
Sound Bank, Synth Type	The sound bank/synth type
Sample Frequency	How often a sample is played in song
Sample List	List of samples associated with the Style
Key	First Key used, pitch offset
Tempo	Start Tempo (e.g., in pulses per quarter note)
Instrument	Identification of a particular instrument in an instrument group. Indexed by type of instrument
State	State of instrument indexed by instrument type (e.g., muted, un-muted, normal, Forced play, solo, etc.)
Parameter	Instrument parameters indexed by instrument type (e.g., volume, pan, timbre, etc.)
PRNG Seed Values	Seed values used to initialize the PRNG routines

Simple Data Structures

FIG. 28



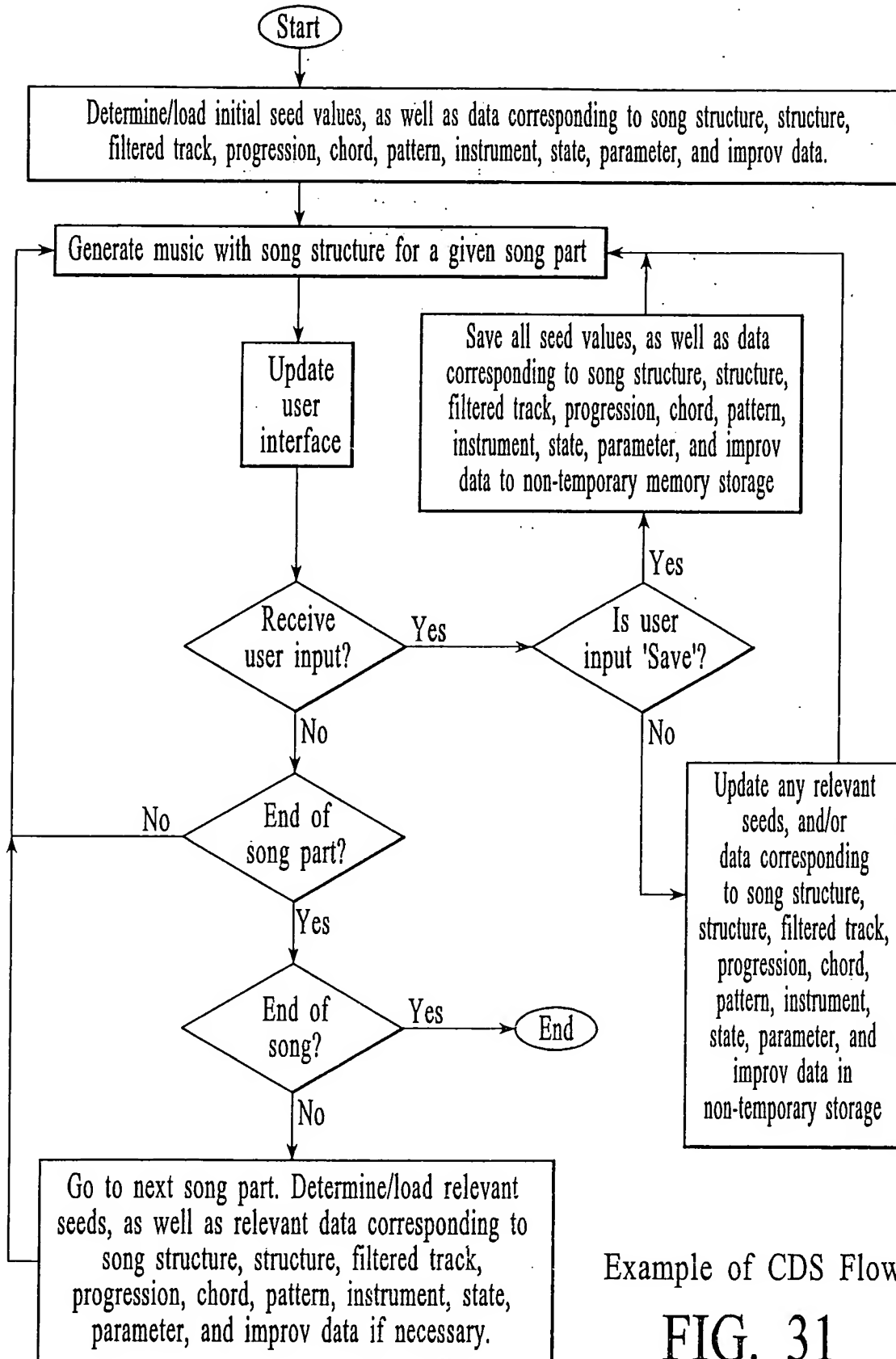
Example of SDS Flow

FIG. 29

Application Revision	Firmware/application version used to generate the data structure
Style, SubStyle	The style and/or substyle
Sound Bank, Synth Type	The sound bank/synth type
Sample Frequency	How often a sample is played in song
Sample List	List of samples associated with the Style
Key	First Key used, pitch offset
Tempo	Start Tempo (e.g., in pulses per quarter note)
Song Structure	Number of types, number of parts, sequence of parts, etc.
Structure	For every part: number of sub-parts, sequence of sub-parts, etc. Indexed by Part
Filtered Track	Type, function (e.g., sawtooth wave, sine wave, square wave, etc.), initial value, etc., of an effect. Indexed by Part.
Progression	Time signature, number of SEQs, list of maked types, etc. Indexed by Sub-Part.
Chord	Time stamp, chord vector, key note, progression mode, etc. Indexed by Sub-Part.
Pattern	Combination (Instrument), block data, effects data, etc. Indexed by Type.
Combination	List of instruments. Sub-set of 'Pattern' above.
FX Pattern	Effects data. Sub-set of 'Pattern' above.
Blocks	Block data. Subset of 'Pattern' above.
Instrument	Identification of a particular instrument in an instrument group. Indexed by type of instrument
State	State of instrument indexed by instrument type (e.g., muted, un-muted, normal, Forced play, solo, etc.)
Parameter	Instrument parameters indexed by instrument type (e.g., volume, param1, param2, etc.)
Improv	Improvisation data (e.g., certain instruments or notes) that might be different each time the song is played.

Complex Data Structures

FIG. 30



Example of CDS Flow

FIG. 31

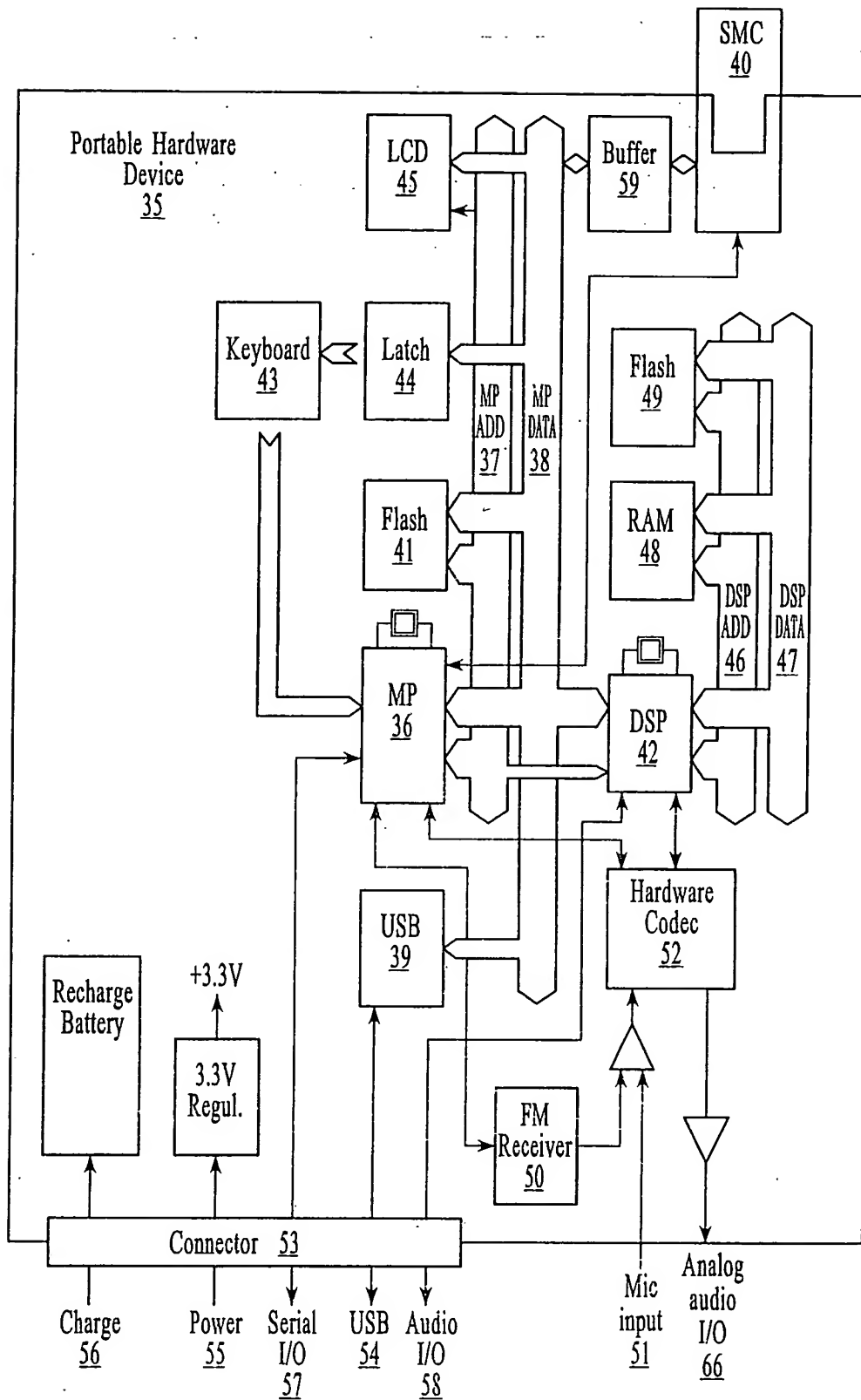
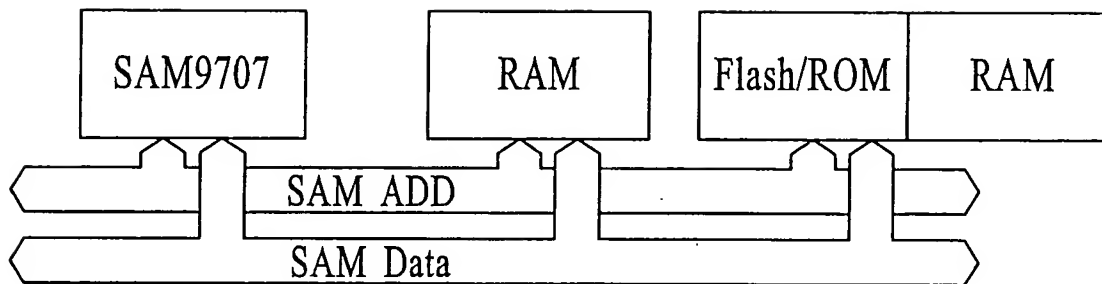


FIG. 32



Additional Variation

FIG. 33

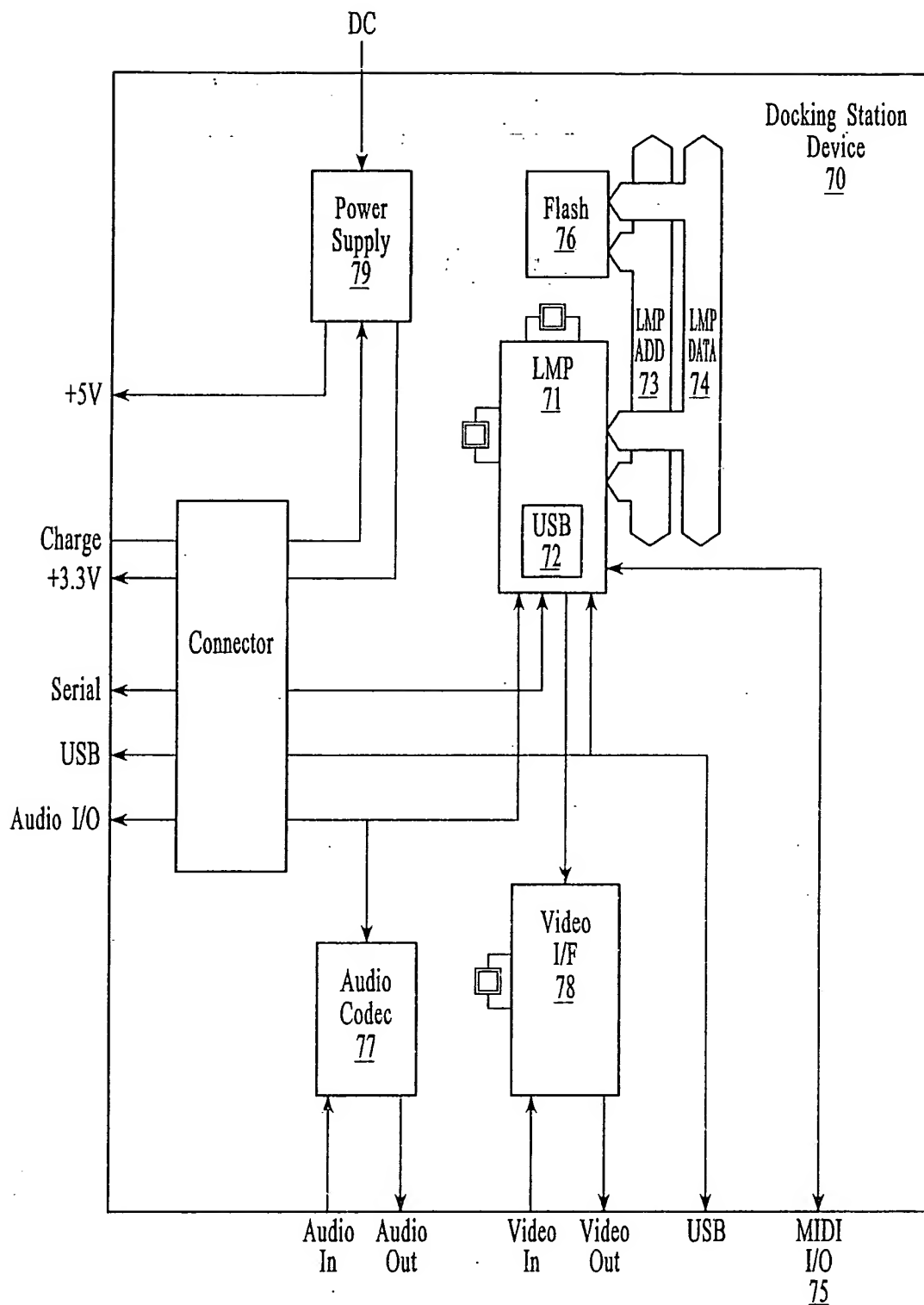
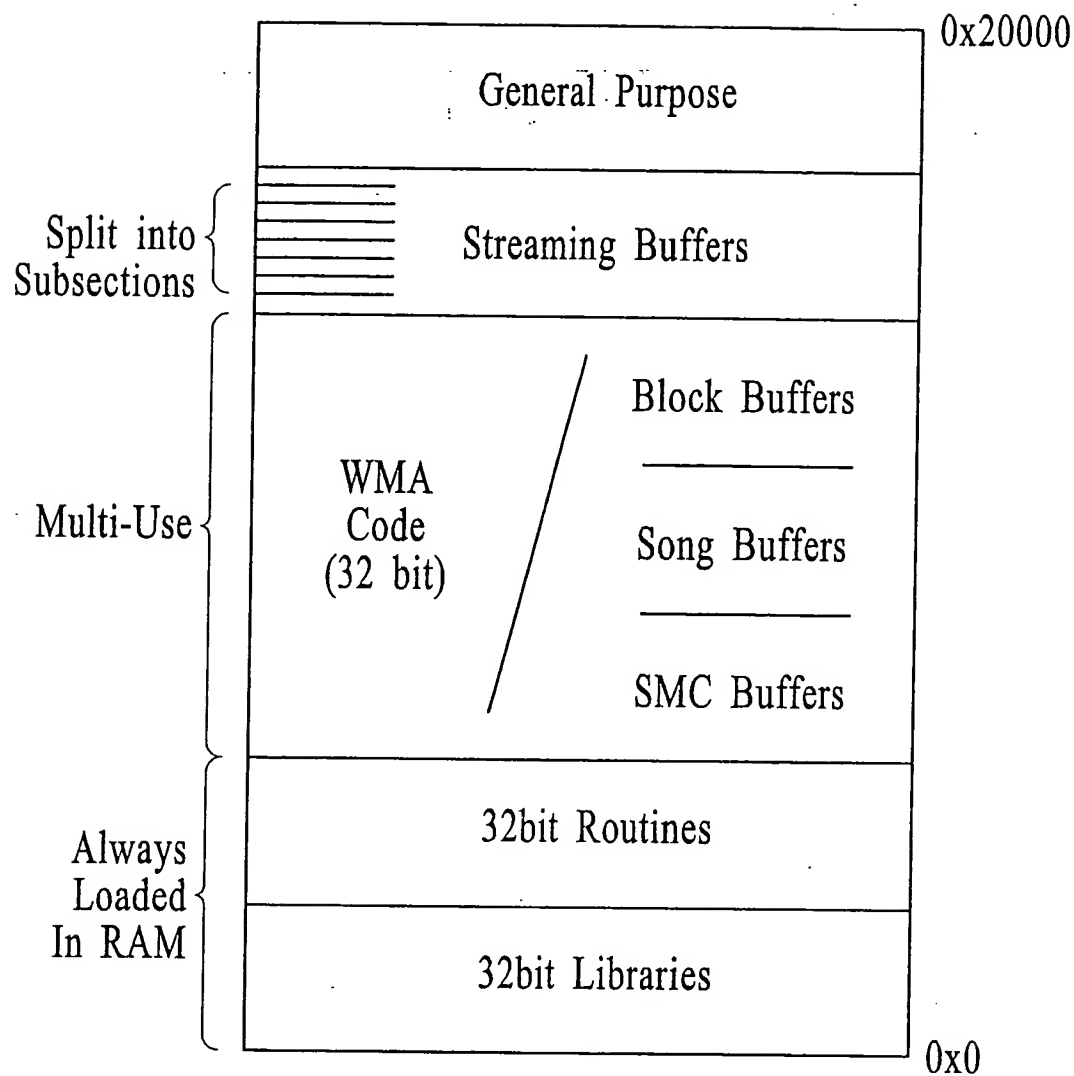
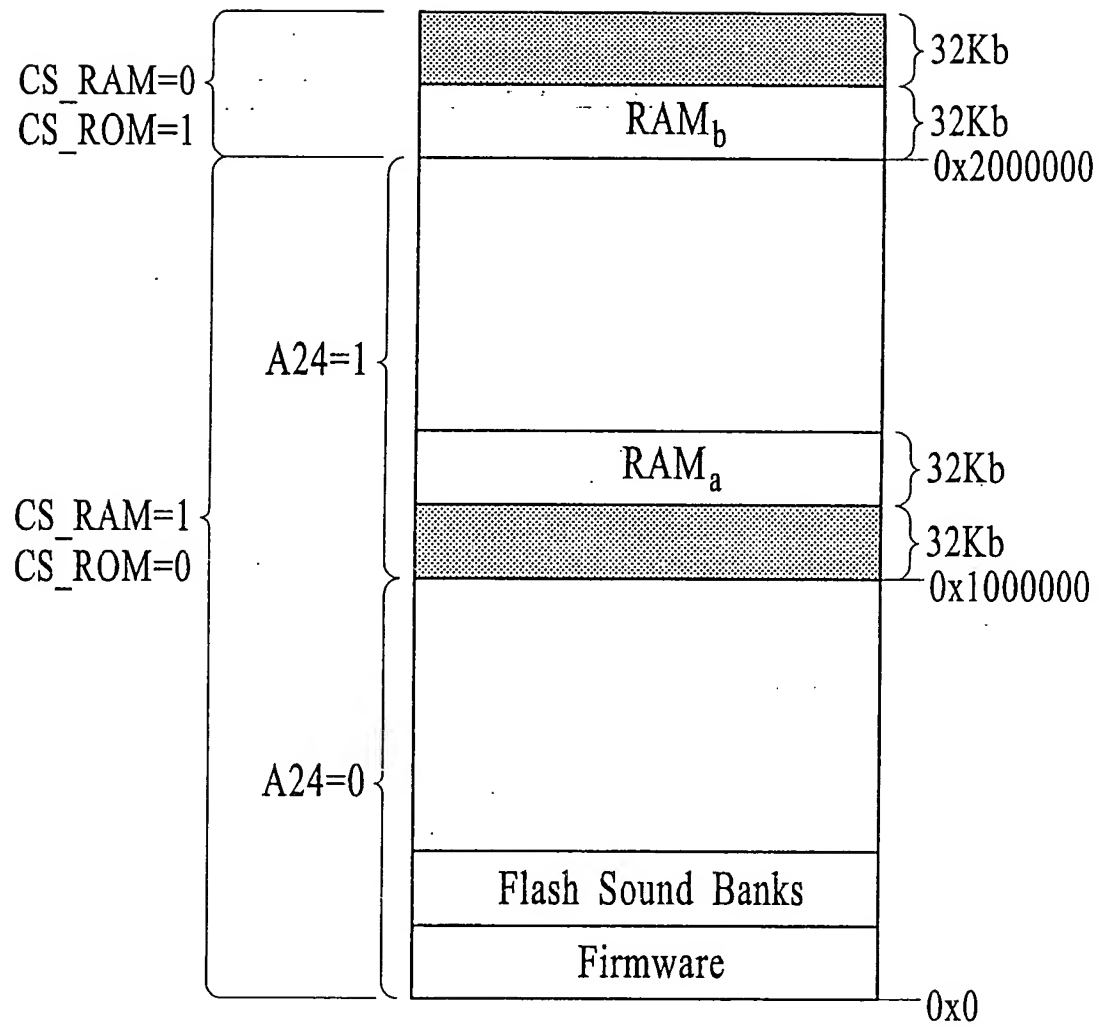


FIG. 34



Address Map for MP RAM

FIG. 35



DSP-Local RAM/Flash Address Space

FIG. 36

A24 \ BOOT	0	1
	0	1
0	Flash	RAM
1	RAM	Flash

Bootstrap Mode Addressing

FIG. 37

		CS_RAM			
		A24			
		CS_ROM			
		BOOT			
				0	1
0	0	NA	NA	Flash	RAM
	1	RAM	RAM	NS	NS
1	0	NA	NA	RAM	Flash
	1	NA	NA	NS	NS

Normal Mode

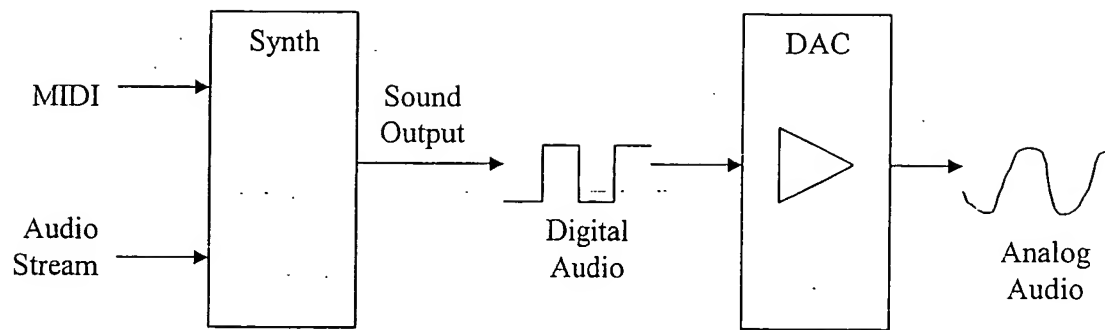
Upgrade Mode

CS_RAM and CS_ROM
are active low

NS = Nothing Selected

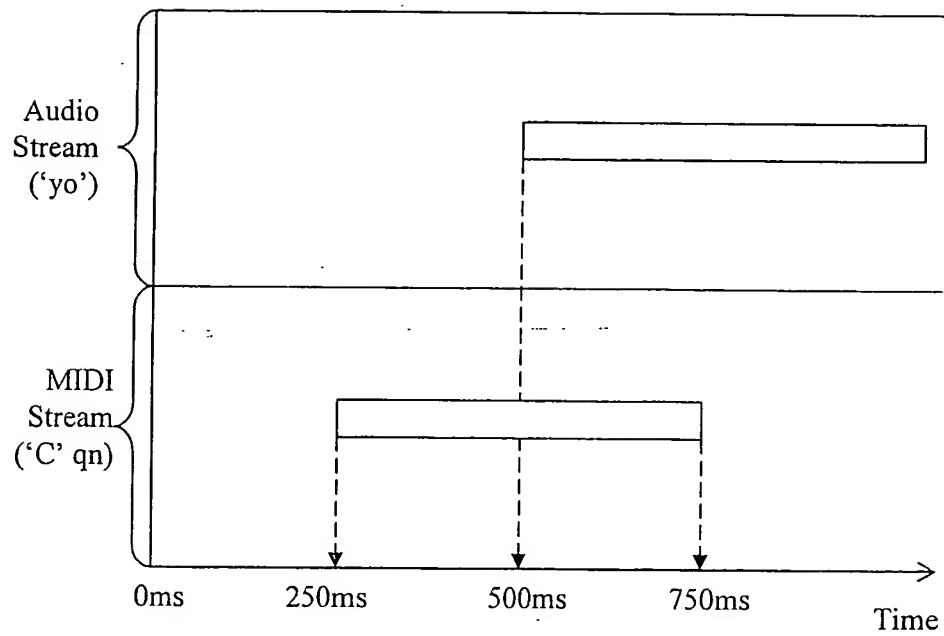
NA = Not Applicable

FIG. 38



MIDI/Audio Stream

FIG. 39



Simplified MIDI/Audio Stream Timeline

FIG. 40

	NRPN Stream (Hexadecimal)	Indication/Meaning
1	B0	Channel Number
2	63	NRPN Controller A (e.g., audio sample type)
3	40	Identification of sample type (e.g., long, short, stereo, mono, etc.)
4	00	Delta time
5	62	NRPN Controller B (e.g., audio effects type)
6	00	Identification of effects type (ping pong, ripple, phaser, distortion, etc.)
7	00	Delta time
8	06	Identification of register for NRPN Controller A value
9	03	NRPN Controller A value (play 3 rd audio sample in set, '00' is random)
10	00	Delta time
11	26	Identification of register for NRPN Controller B value
12	07	NRPN Controller B value (apply audio effect #7, '00' is random)

Simplified NRPN Example

FIG. 41

\triangle 250ms
Note = On Channel = 1 Pitch = C
\triangle 250ms
NRPN Audio X, [P], [E]
\triangle 250ms
Note = Off Channel = 1 Pitch = C

Simplified Special MIDI Type File

FIG. 42

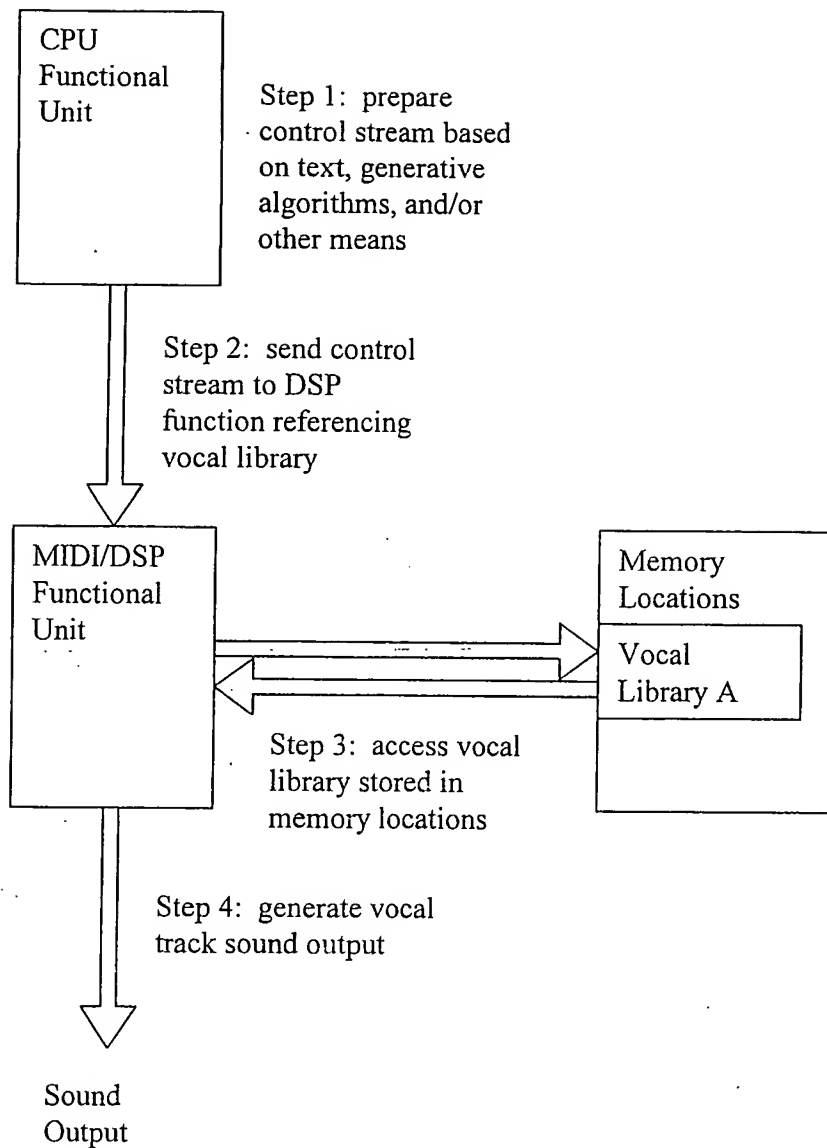


FIG. 43

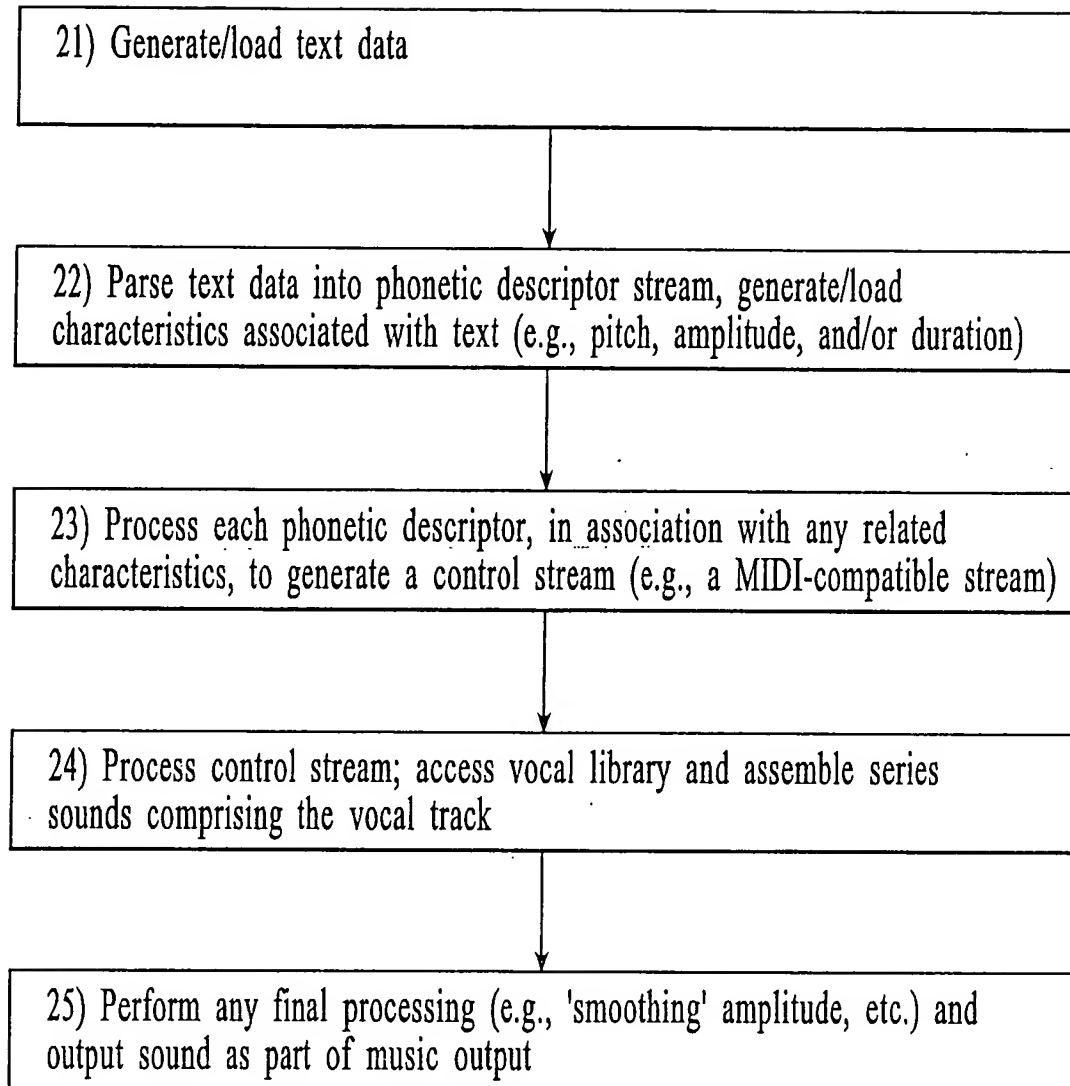


FIG. 44

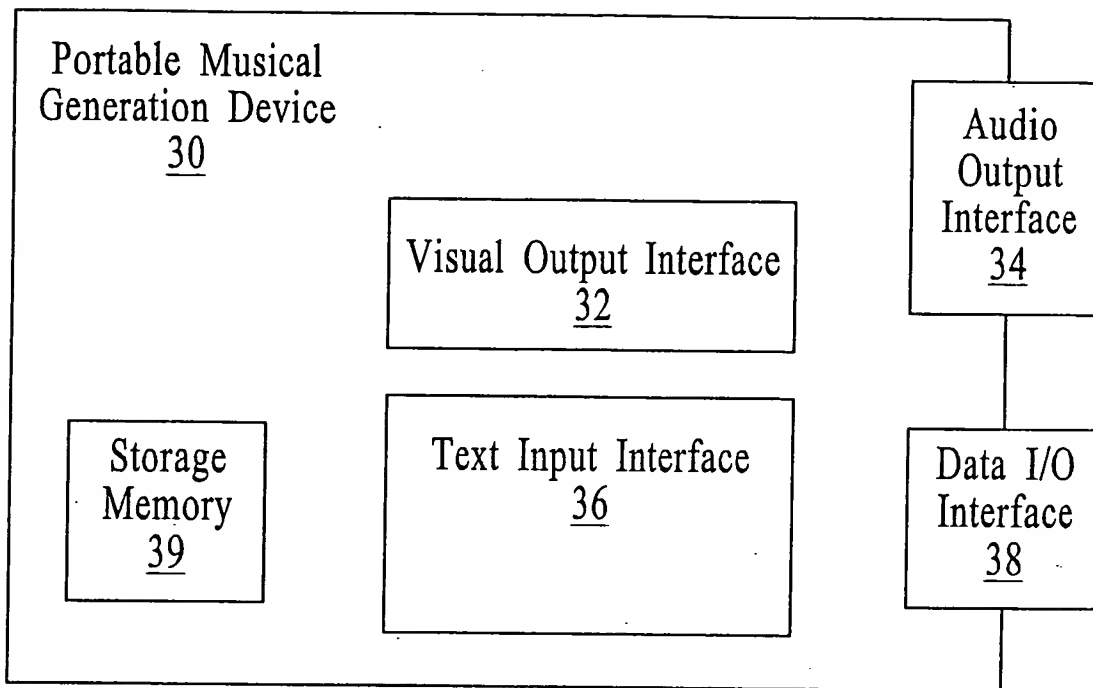


FIG. 45

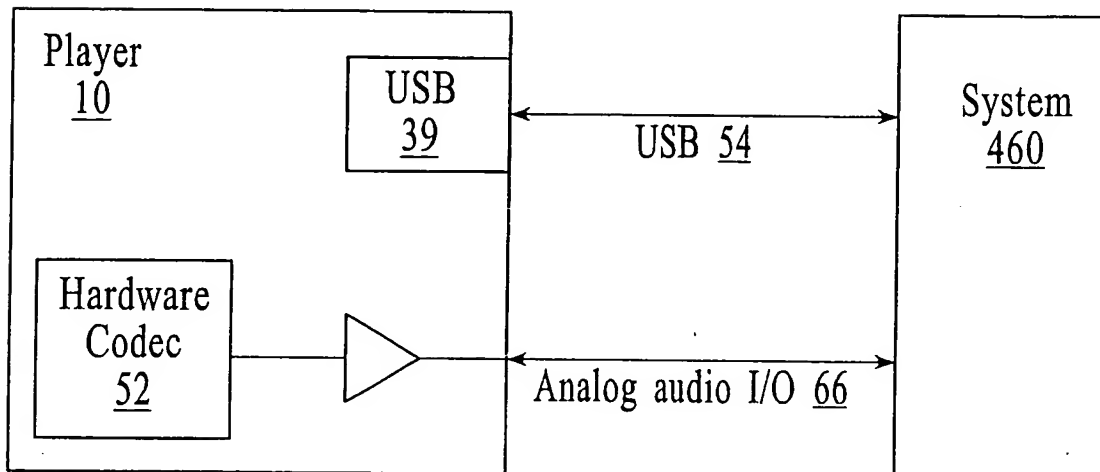


FIG. 46

SLS Header	Slot 0	Slot 1	...	Slot N-1
------------	--------	--------	-----	----------

Slotted Structure

FIG. 47

Header Length (= 14)	Checksum	SLS Shade	SLS Type	SLS Version	Data Length Length (= n1)	Num Slots (= N)
2 bytes	2 bytes	2 bytes	2 bytes	2 bytes	2 bytes	2 bytes

SLS Header

FIG. 48

Slot Type	Name Length (= n2)	Name	Data Length (= n3)	Data
2 bytes	2 bytes	n2 bytes	n1 bytes	n3 bytes

where n1 = Data Length Length value in SLS Header.

Slot Format

FIG. 49

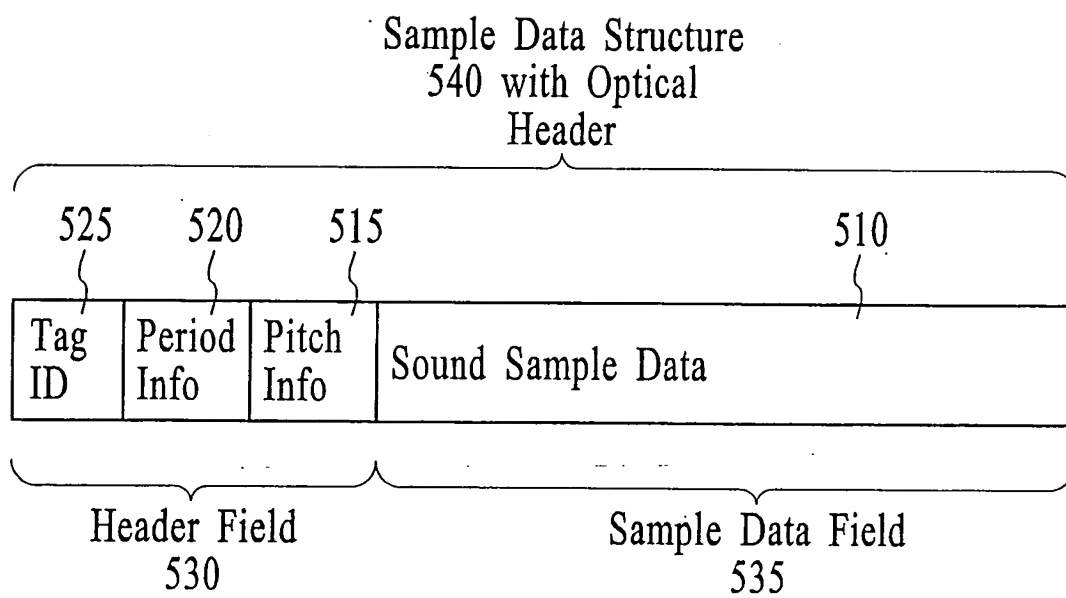


FIG. 50

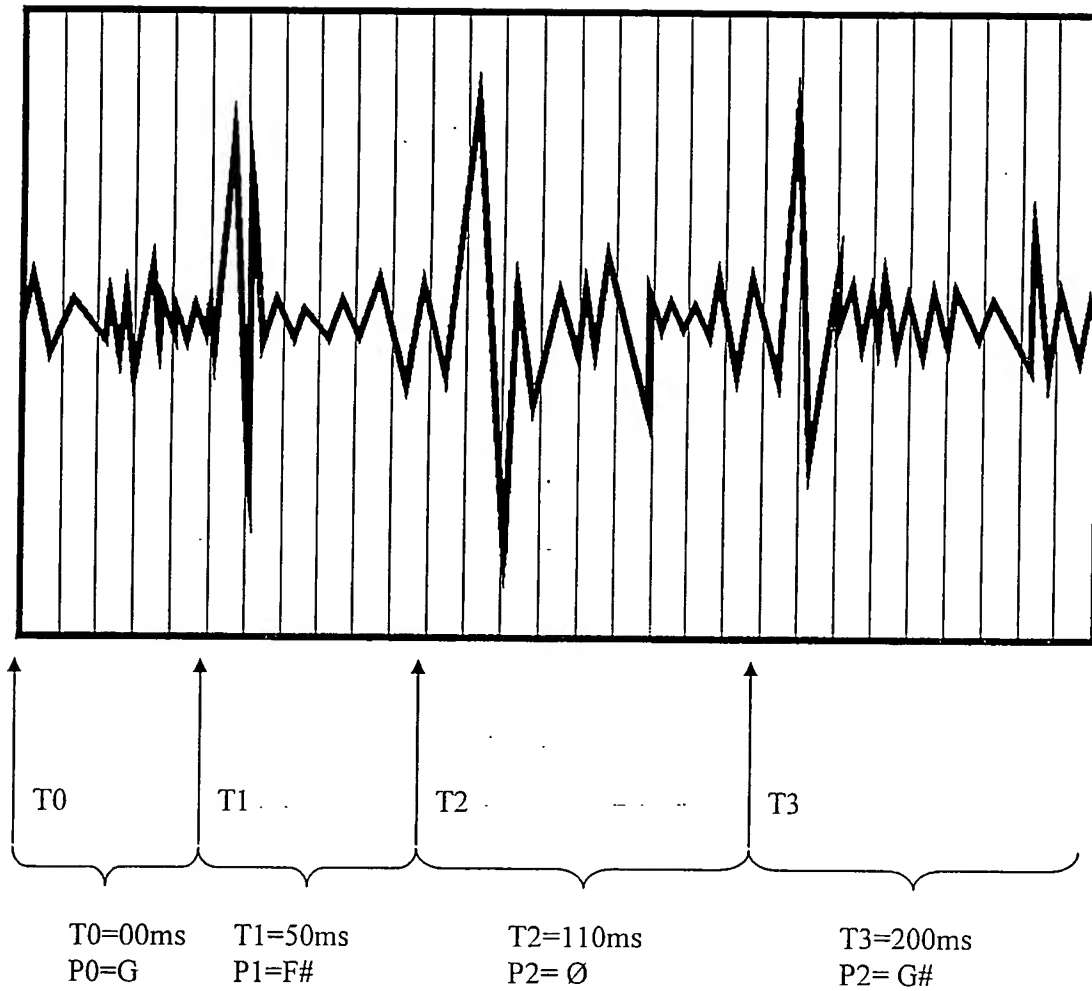


FIG. 51

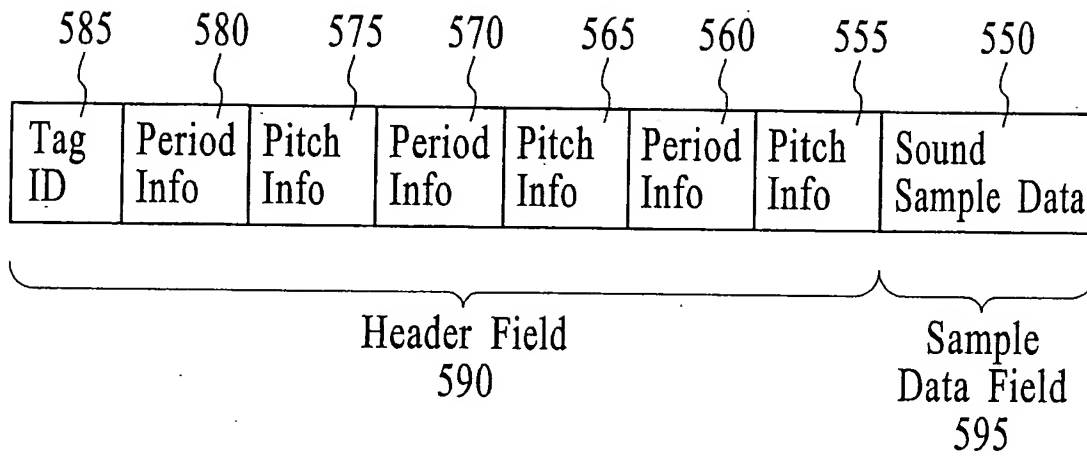


FIG. 52

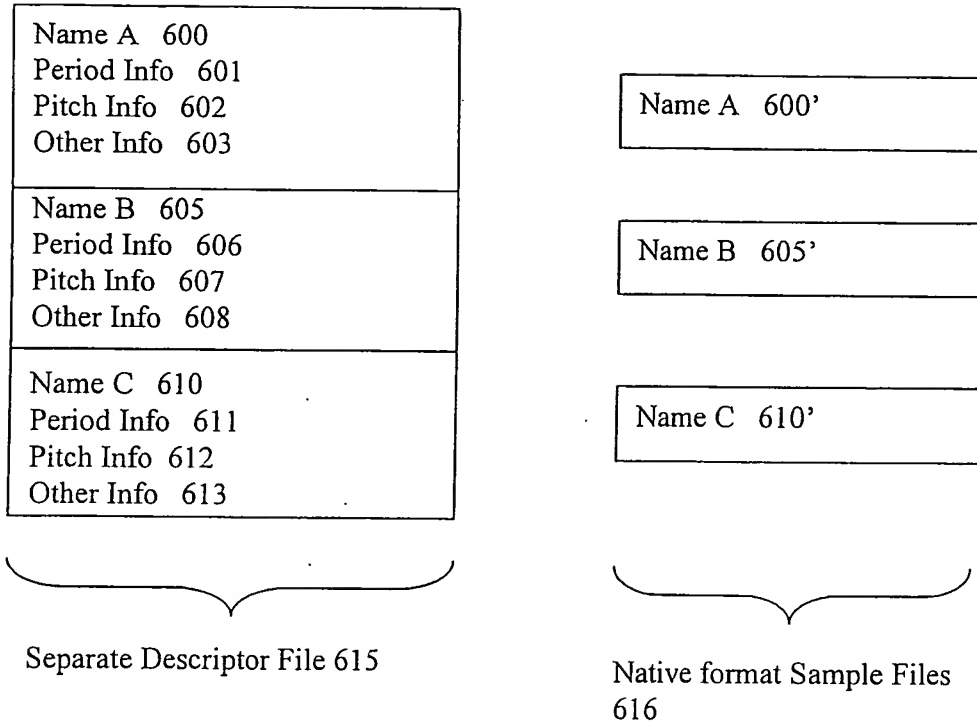


FIG. 53

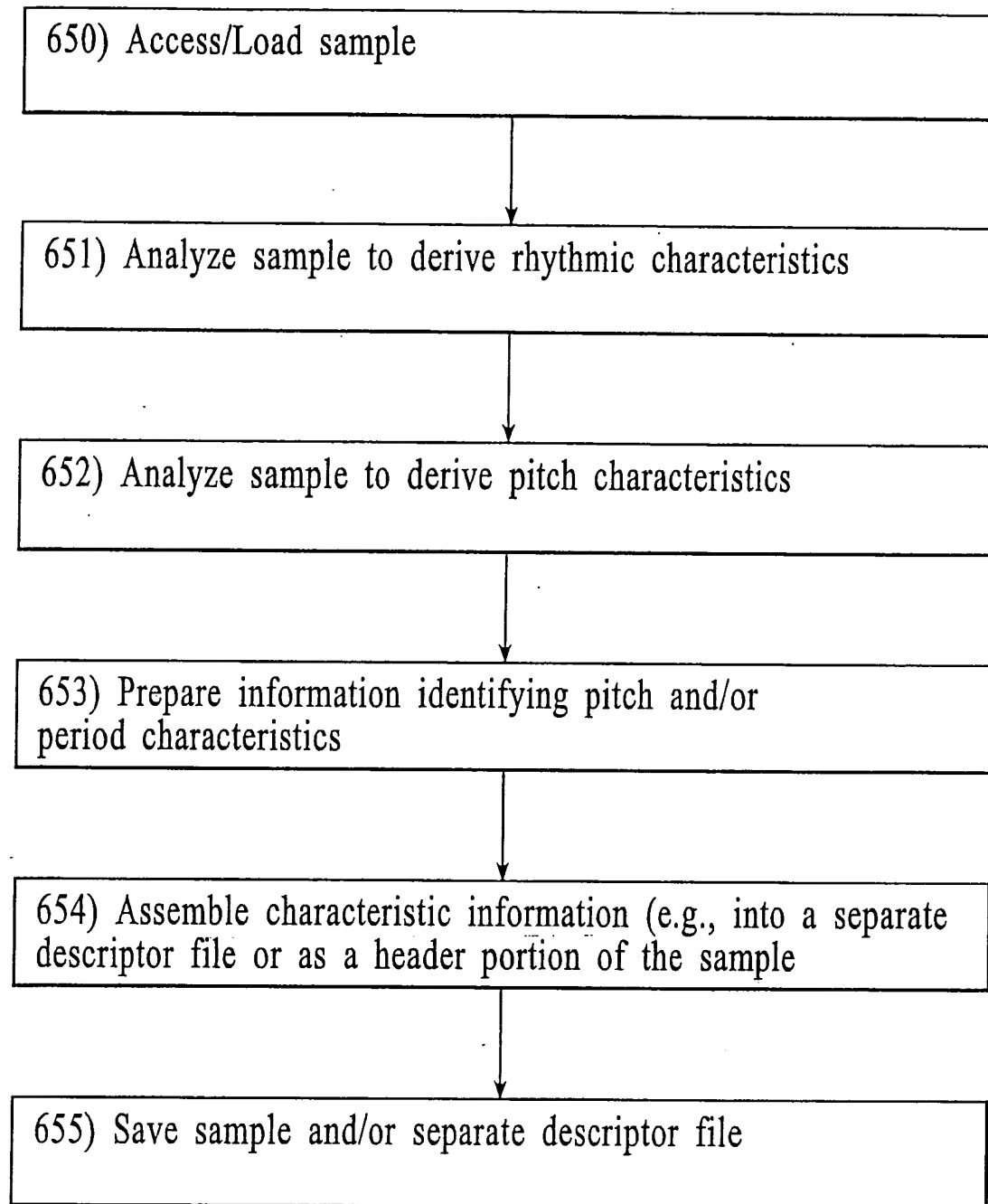


FIG. 54

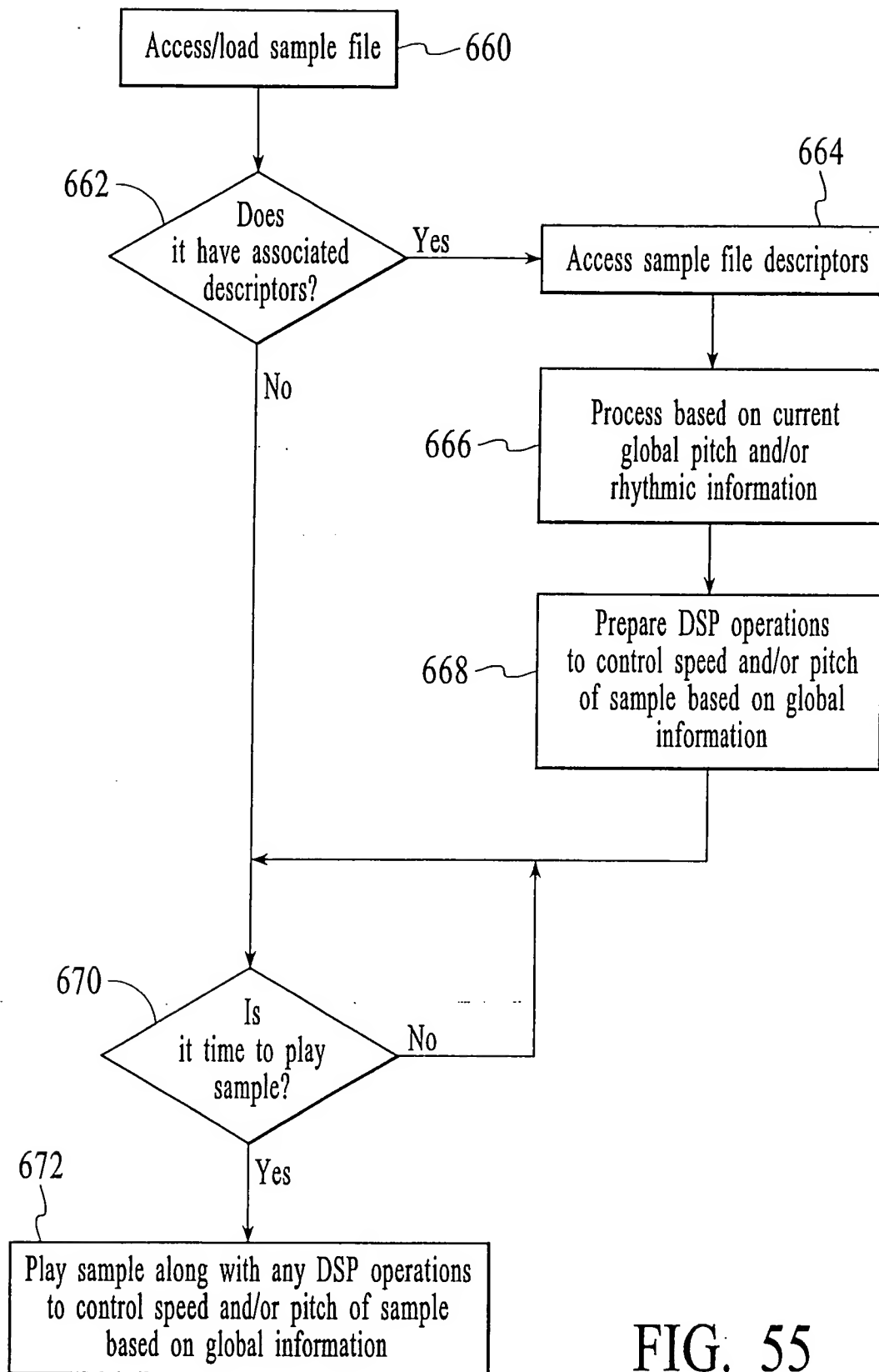


FIG. 55

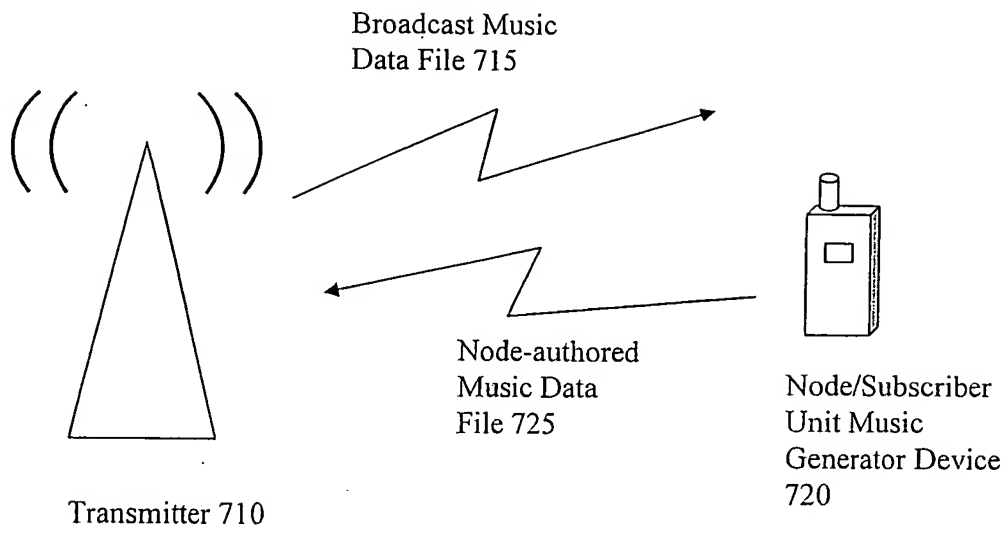
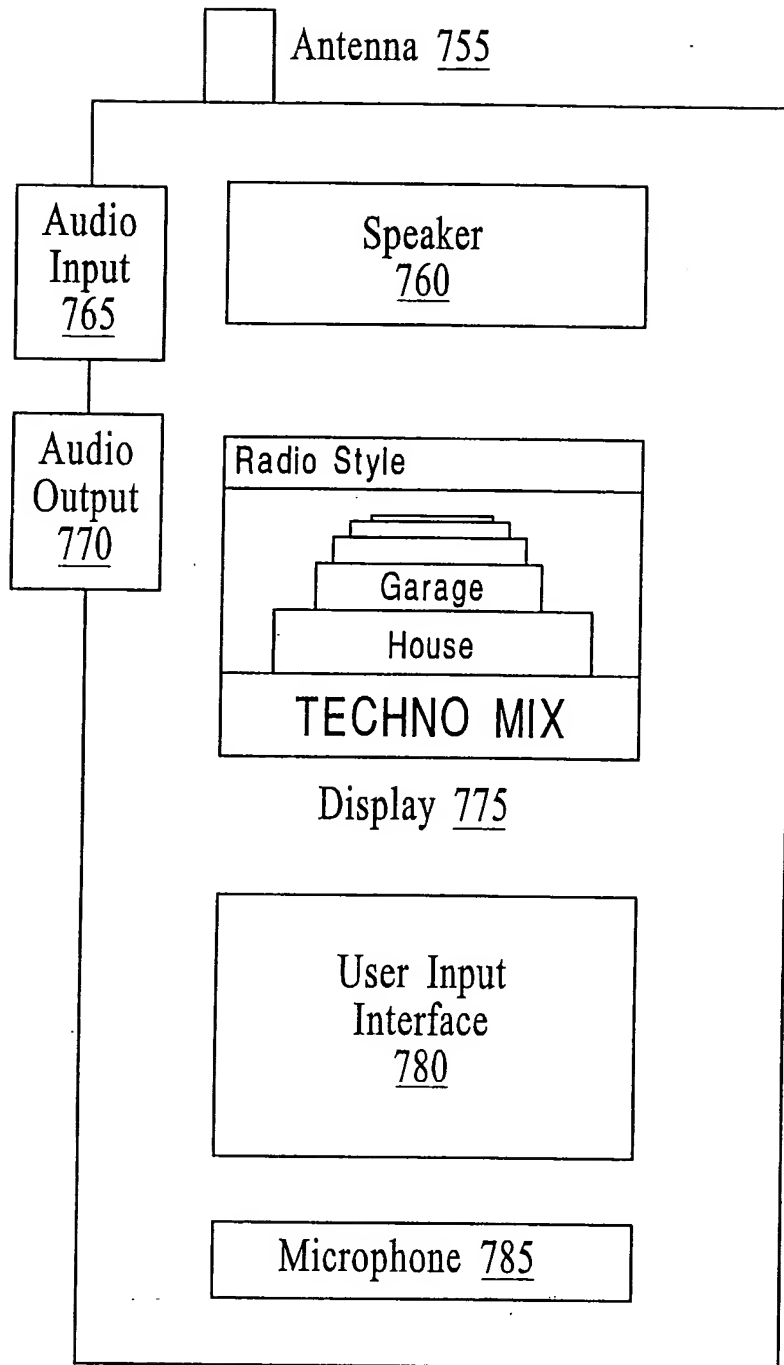
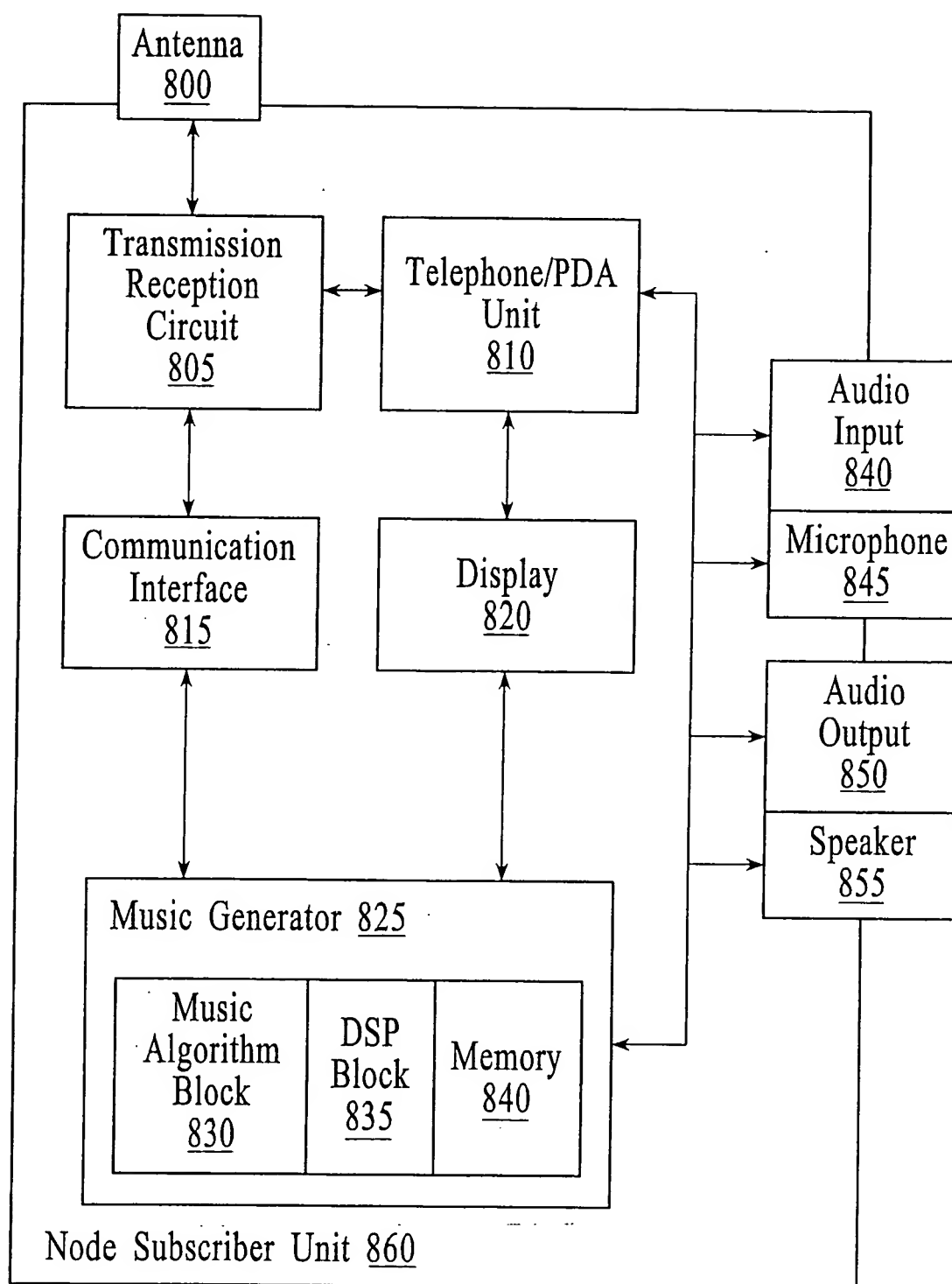


FIG. 56



Node/Subscriber Unit Radio Style Selection

FIG. 57



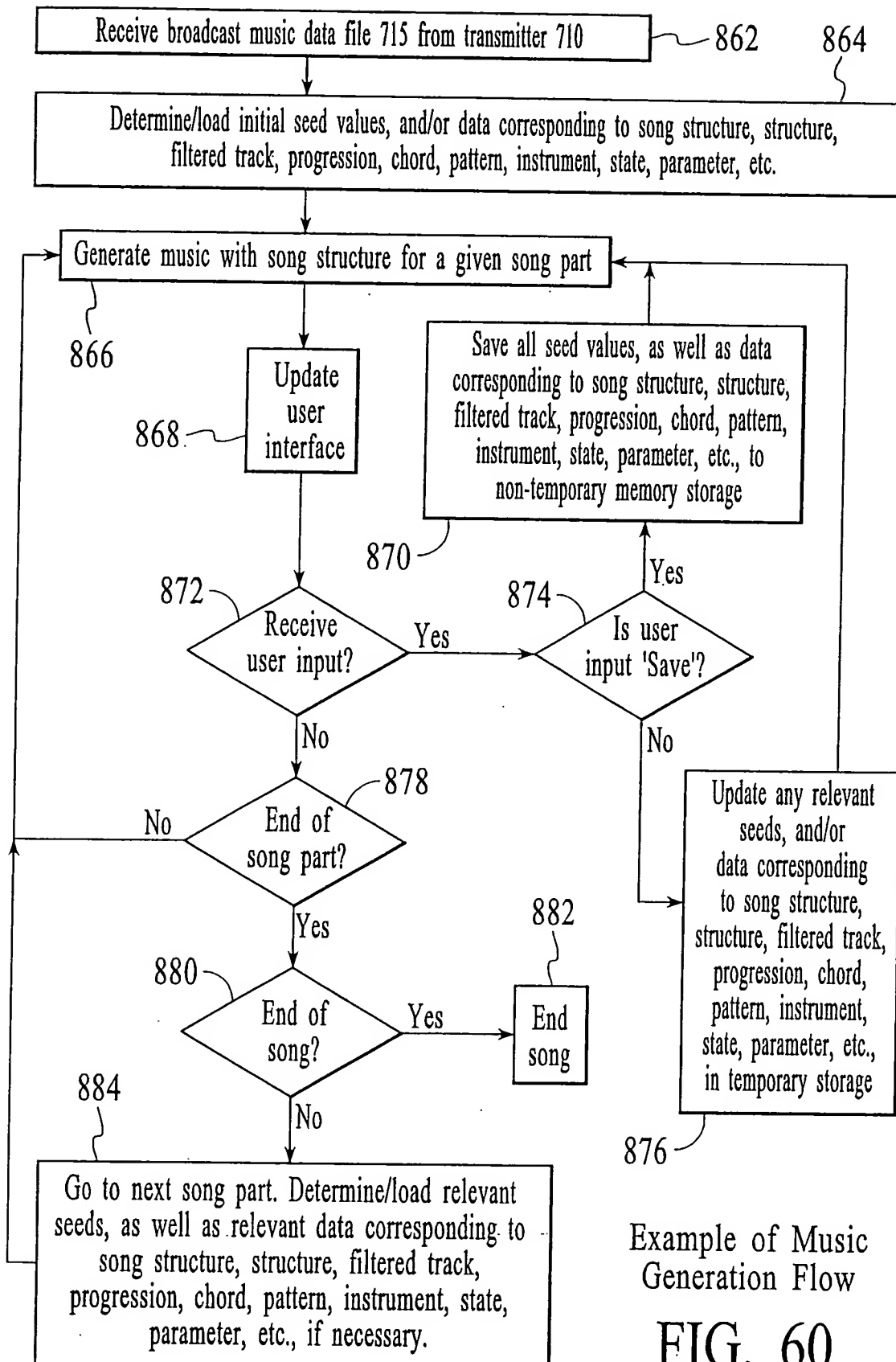
Node/Subscriber Unit Functional Blocks

FIG. 58

Application Revision	Firmware/application version used to generate the data structure
Style, SubStyle	The style and/or substyle (and/or Radio Station Style)
Sound Bank, Synth Type	The sound bank/synth type
Sample Frequency	How often a sample is played in song
Sample List	List of samples associated with the Style
Key	First Key used, pitch offset
Tempo	Start Tempo (e.g., in pulses per quarter note)
Song Structure	Number of types, number of parts, sequence of parts, etc.
Structure	For every part: number of sub-parts, sequence of sub-parts, etc. Indexed by Part
Filtered Track	Type, function (e.g., sawtooth wave, sine wave, square wave, etc.), initial value, etc., of an effect. Indexed by Part.
Progression	Time signature, number of SEQs, list of maked types, etc. Indexed by Sub-Part.
Chord	Time stamp, chord vector, key note, progression mode, etc. Indexed by Sub-Part.
Pattern	Combination (Instrument), block data, effects data, etc. Indexed by Type.
Combination	List of instruments. Sub-set of 'Pattern' above.
FX Pattern	Effects data. Sub-set of 'Pattern' above.
Blocks	Block data. Subset of 'Pattern' above.
Instrument	Identification of a particular instrument in an instrument group. Indexed by type of instrument
State	State of instrument indexed by instrument type (e.g., muted, un-muted, normal, Forced play, solo, etc.)
Parameter	Instrument parameters indexed by instrument type (e.g., volume, param1, param2, etc.)
PRNG Seed Values	Preferably a series of numerical values that are used to initialize the pseudo-random number generation (PRNG) routines (used in certain embodiments).
Sound Bank Data	Soundbank data associated with a particular song; preferably loaded into non-volatile memory such that the sound bank data may be used during the generation of music output.

Example Music Data File

Figure 59



Example of Music
Generation Flow

FIG. 60

Data Services	Description
TIA/EIA IS-95A	Mobile Station-Base Station Compatibility standard for Dual-Mode Wideband Spread Spectrum Cellular System
TIA/EIA IS-99	Data Service Option standard for Wideband Spread Spectrum Digital Cellular System
TIA/EIA IS-637	Short Message Service for Wideband Spread Spectrum Cellular System
TIA/EIA IS-657	Packet Data Service Optional standard for Wideband Spread Spectrum Systems
TIA/EIA IS-658	Data Services Interworking Function Interface for Wideband Spread Spectrum Systems
TIA/EIA IS-707	Short Message Service 14.4 Kbps
TIA/EIA TSB-79	Short Message Service for Wideband Spread Spectrum Systems
TIA/EIA TSB39-A	Message Type Assignments

Exemplary Standards associated with
Cellular Data transmission/Reception Services

Fig. 61

SMS Broadcast Message Parameters

Parameter	Type
Broadcast Service Category	Mandatory
Bearer Data	Optional

The Bearer Data parameter variable-length format:

Field	Length (bits)
PARAMETER_ID	8
PARAMETER_LEN	8
One or more occurrences of the following subparameter record:	
SUBPARAMETER_ID	8
SUBPARAM_LEN	8
Subparameter Data	8 ∞ SUBPARAM_LEN

PARAMETER_ID: SMS parameter identifier. This field shall be set to '00001000'.

PARAMETER_LEN: SMS message parameter length. This field shall be set to the number of octets in the parameter, not including the PARAMETER_ID and PARAMETER_LEN fields.

SUBPARAMETER_ID: Subparameter identifier.

SUBPARAM_LEN: Subparameter length. This field shall be set to the number of octets in the subparameter, not including the SUBPARAMETER_ID and SUBPARAM_LEN fields.

Subparameter Data: Subparameter data fields.

Exemplary Excerpts from
TIA/EIA IS-637 Short Message Service for Wideband
Spread Spectrum Cellular System

Fig. 62

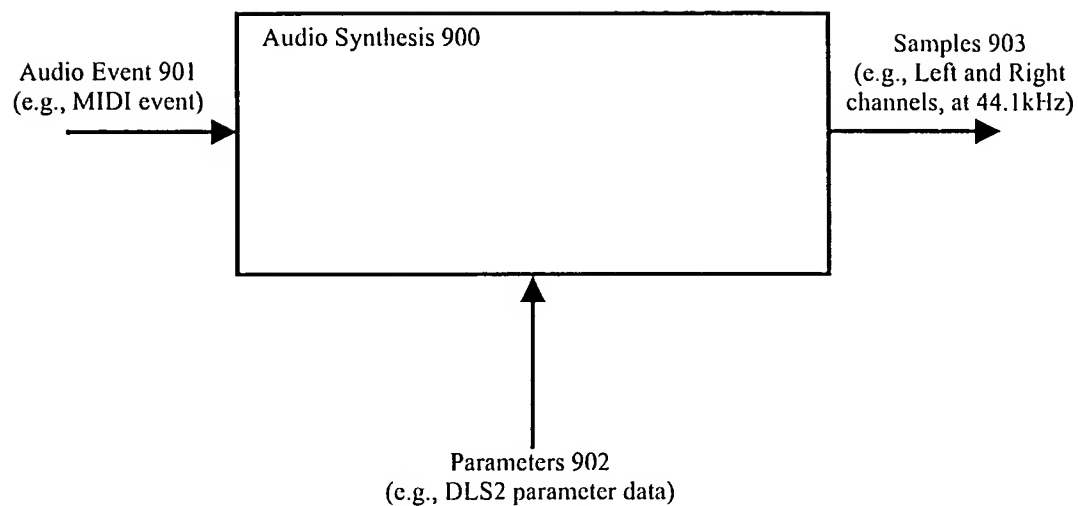


Figure 63
Exemplary Synthesis
Structure

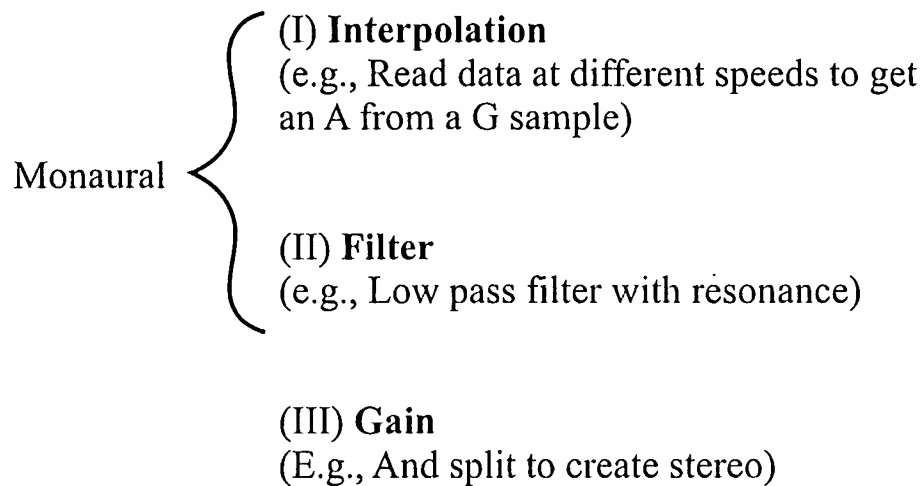


Figure 64
Exemplary Synthesis Process
Flow

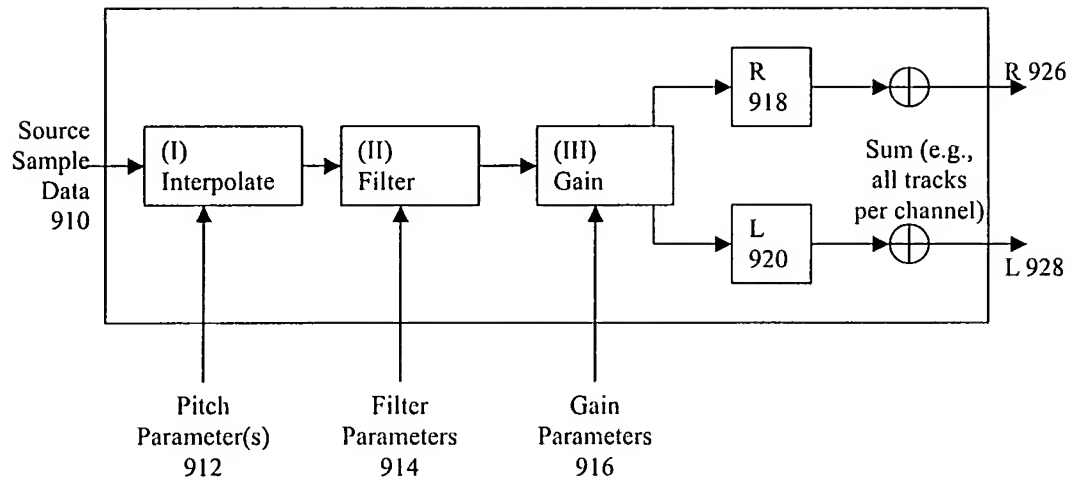


Figure 65
Exemplary Synthesis
Structure

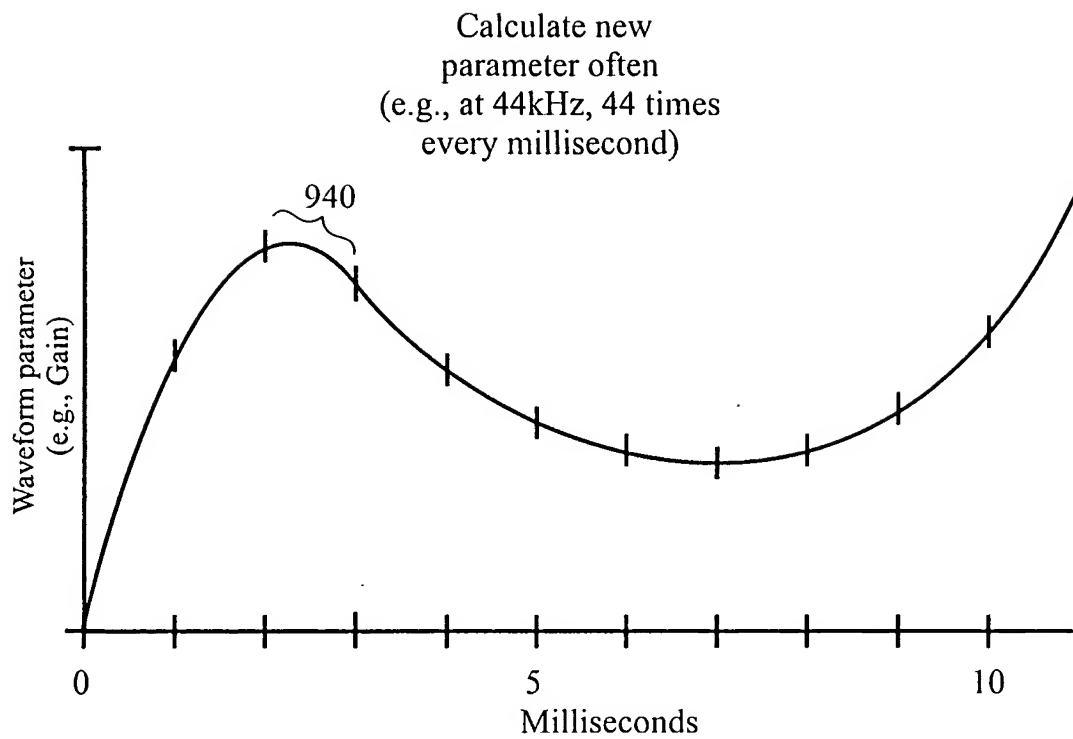


Figure 66
Prior Art Waveform
Calculation Timing

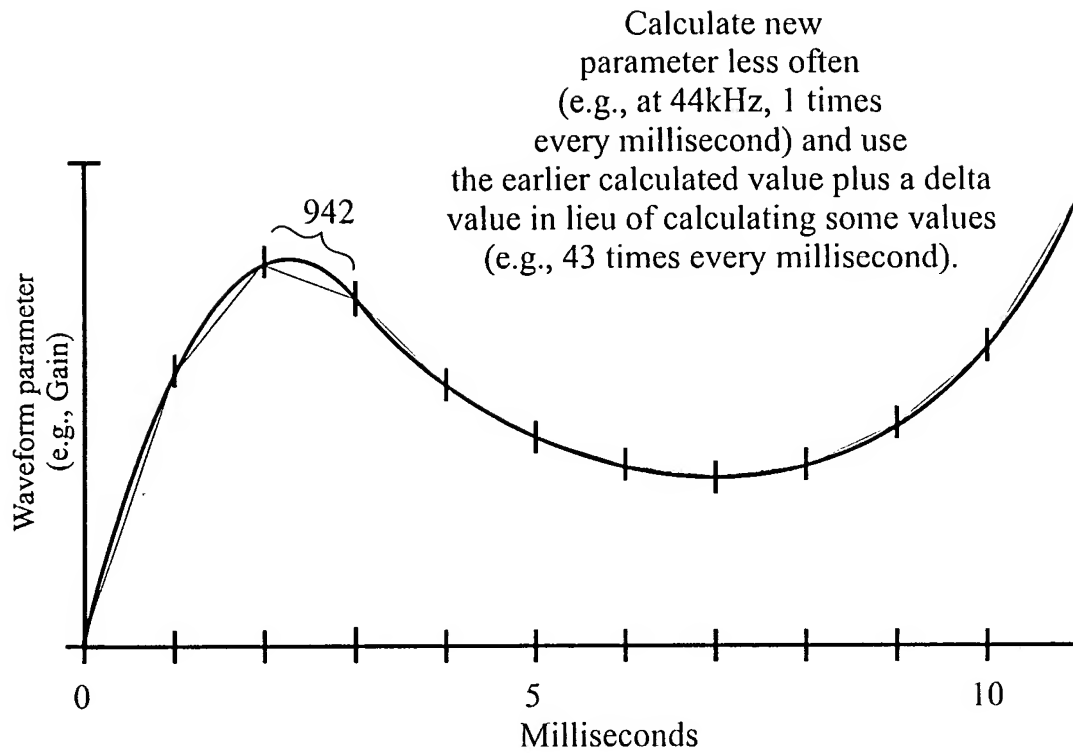


Figure 67
Exemplary Waveform
Calculation Timing

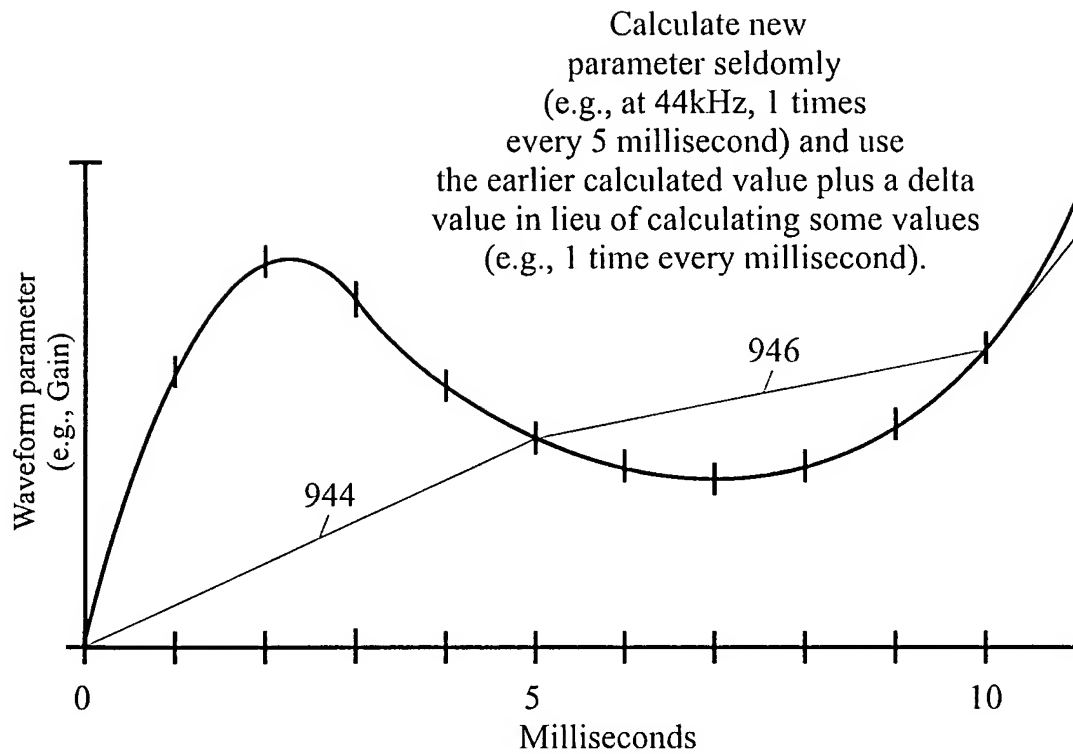


Figure 68
Exemplary Waveform
Calculation Timing

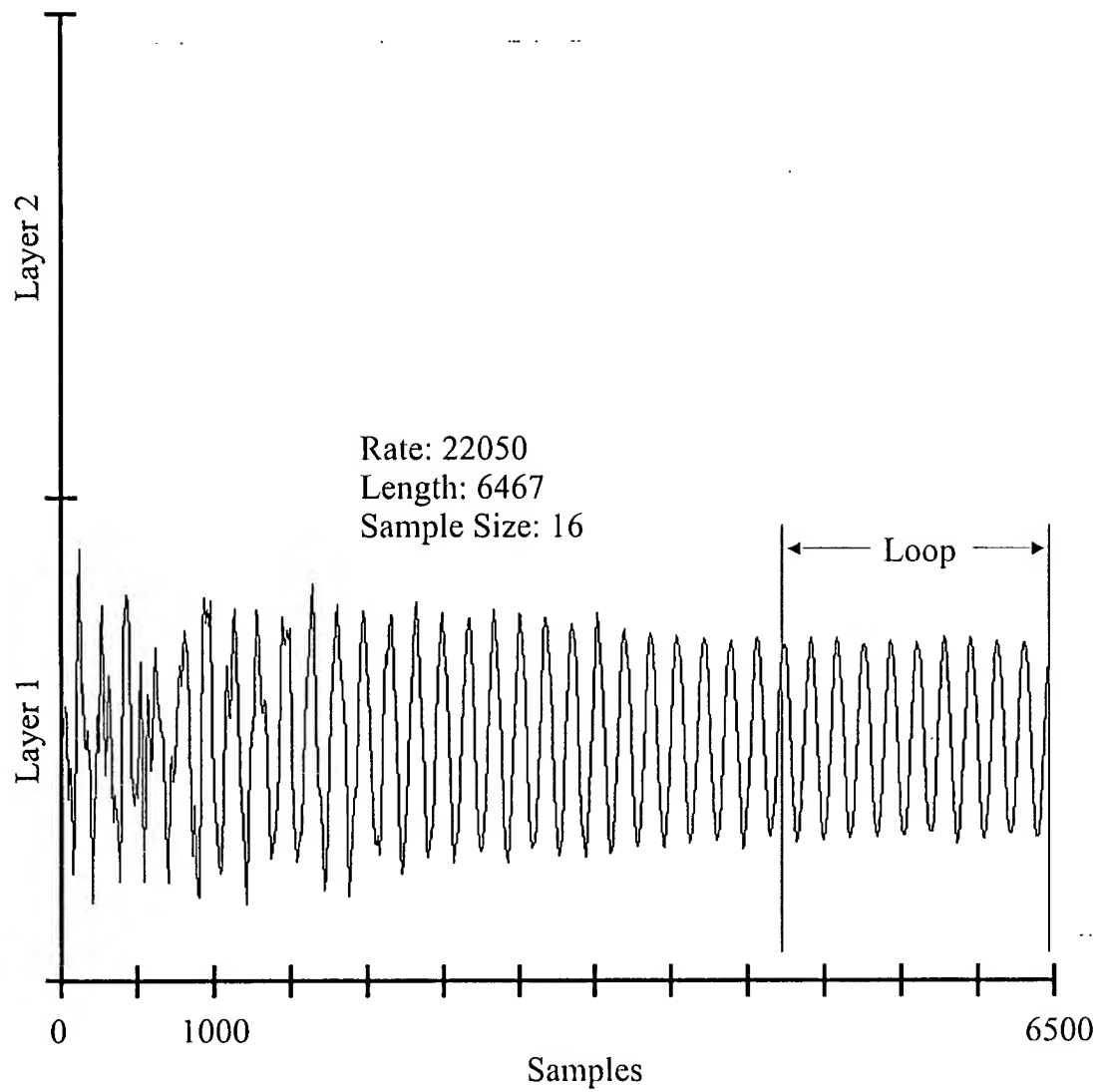


Figure 69
Prior Art Tom Sound

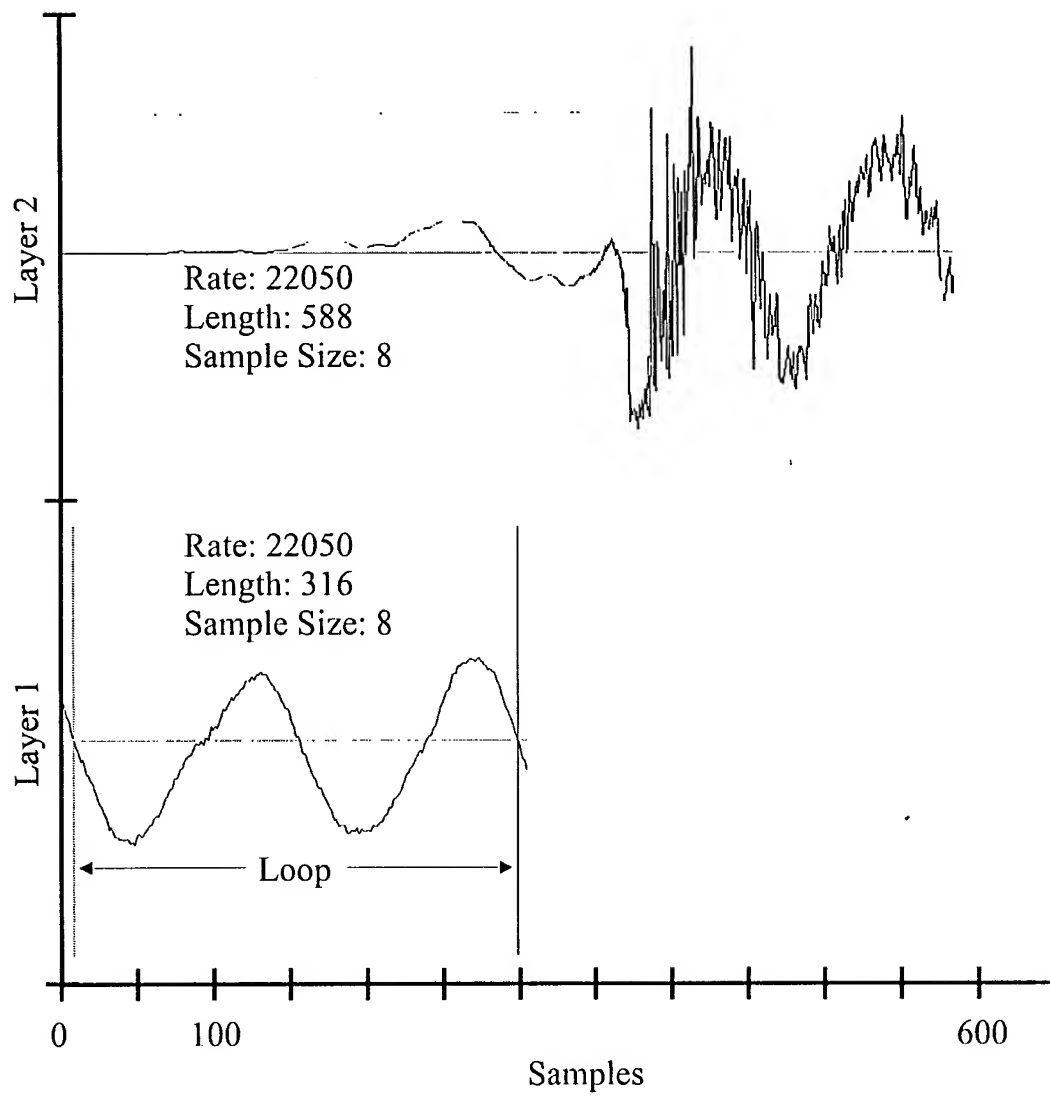


Figure 70
Exemplary Tom Sound

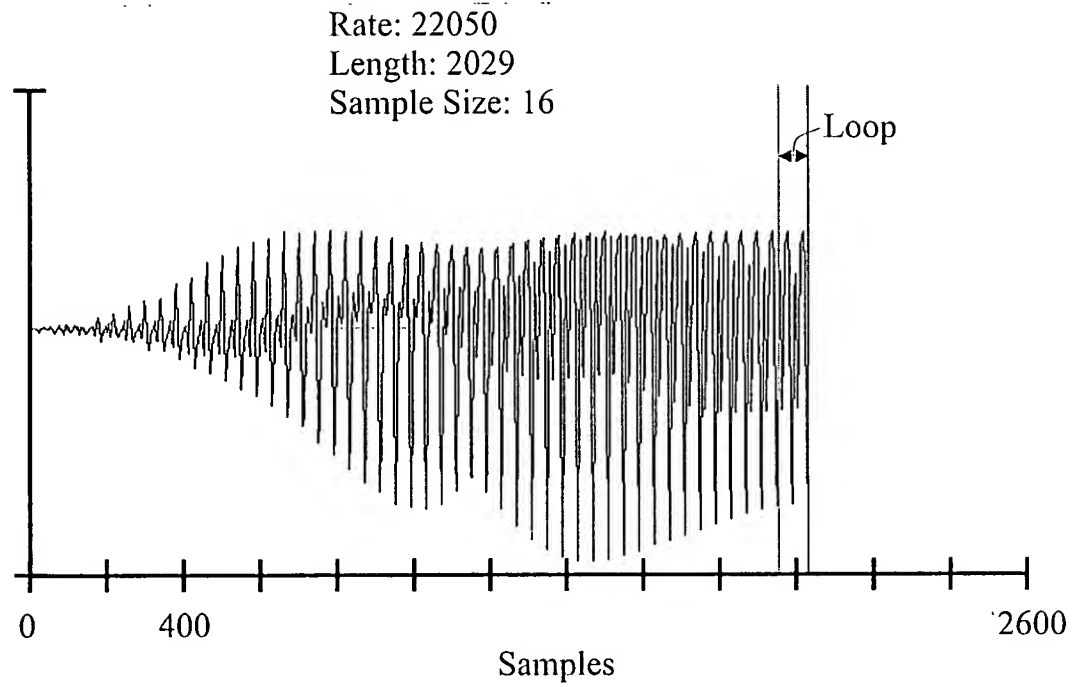


Figure 71
Prior Art Flute Sound

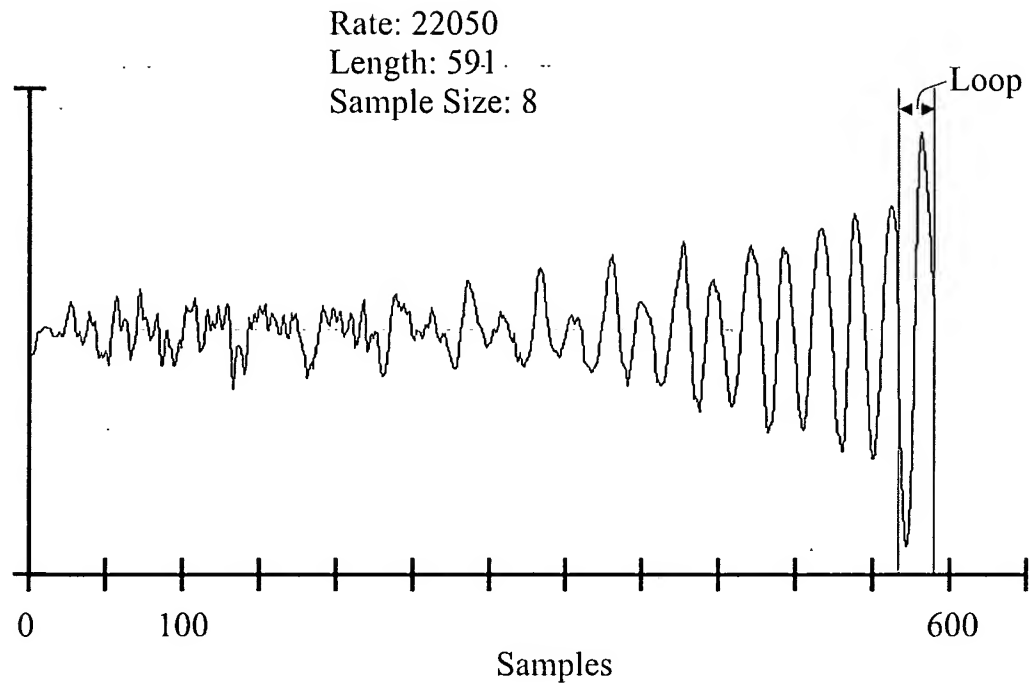


Figure 72
Exemplary Flute Sound

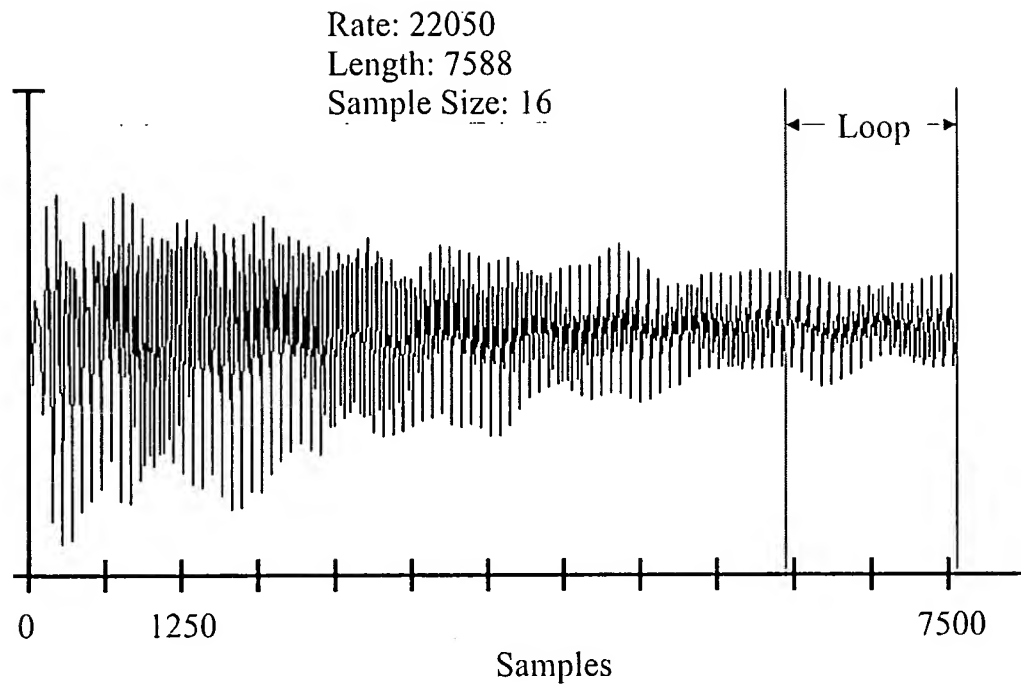


Figure 73
Prior Art Piano Sound

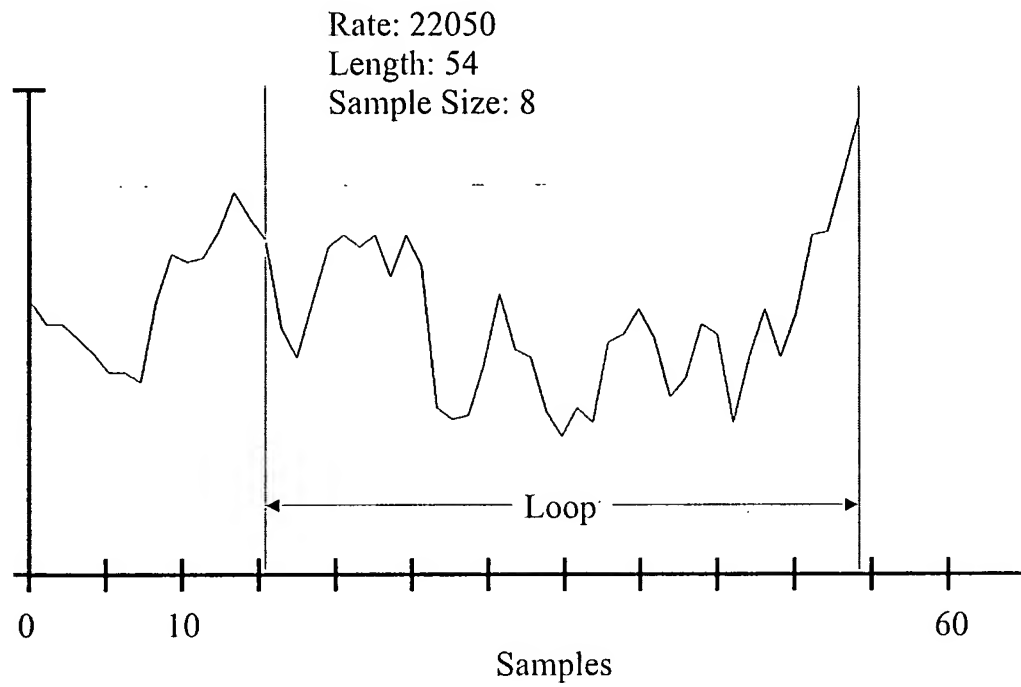


Figure 74
Exemplary Piano Sound

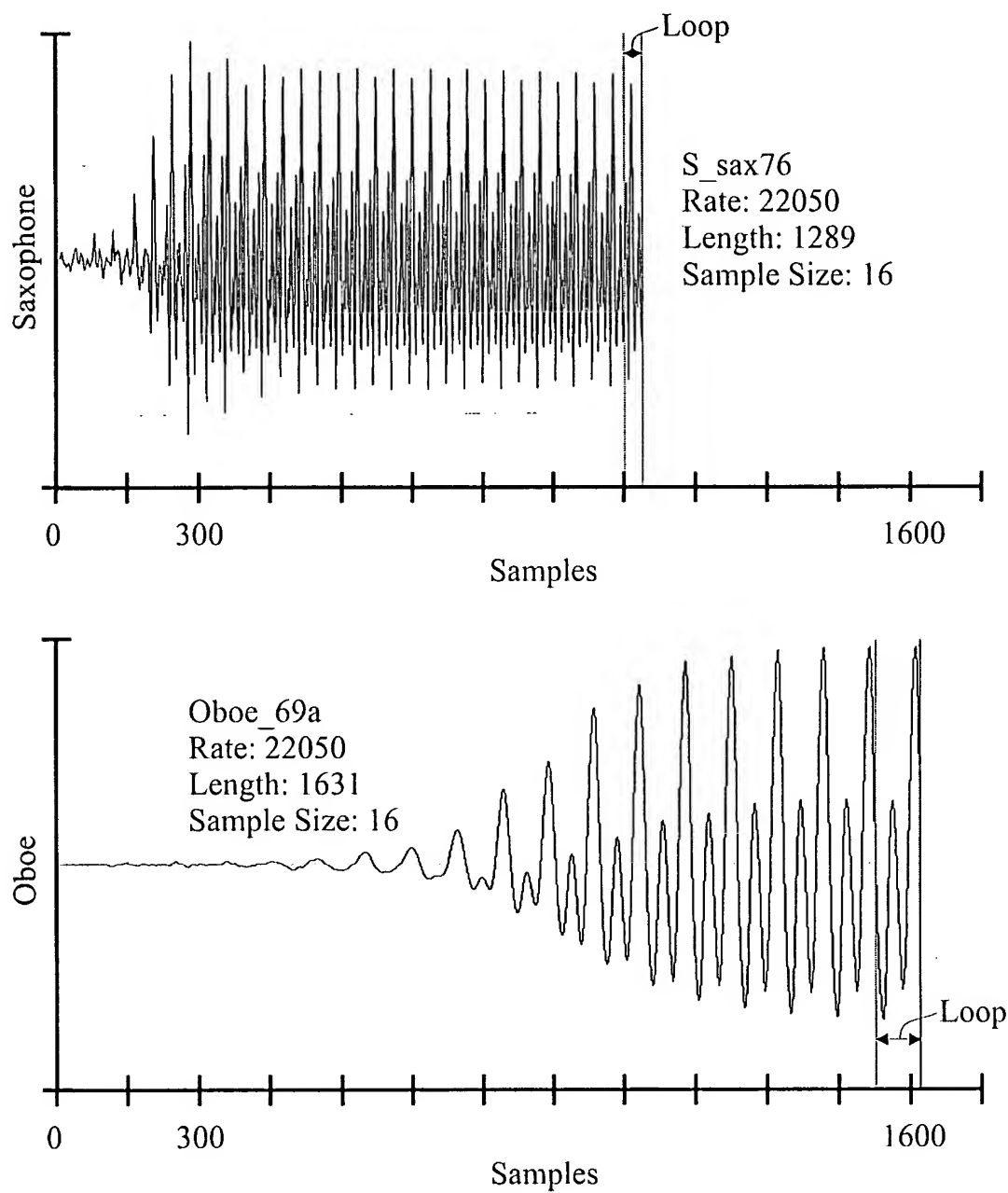


Figure 75
Prior Art Saxophone and
Oboe Sounds

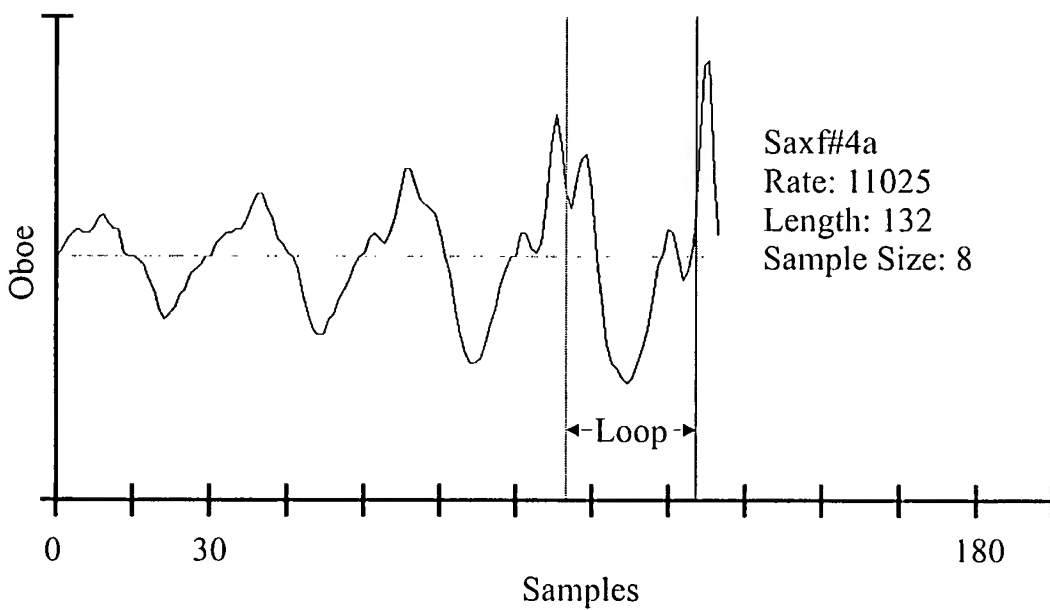
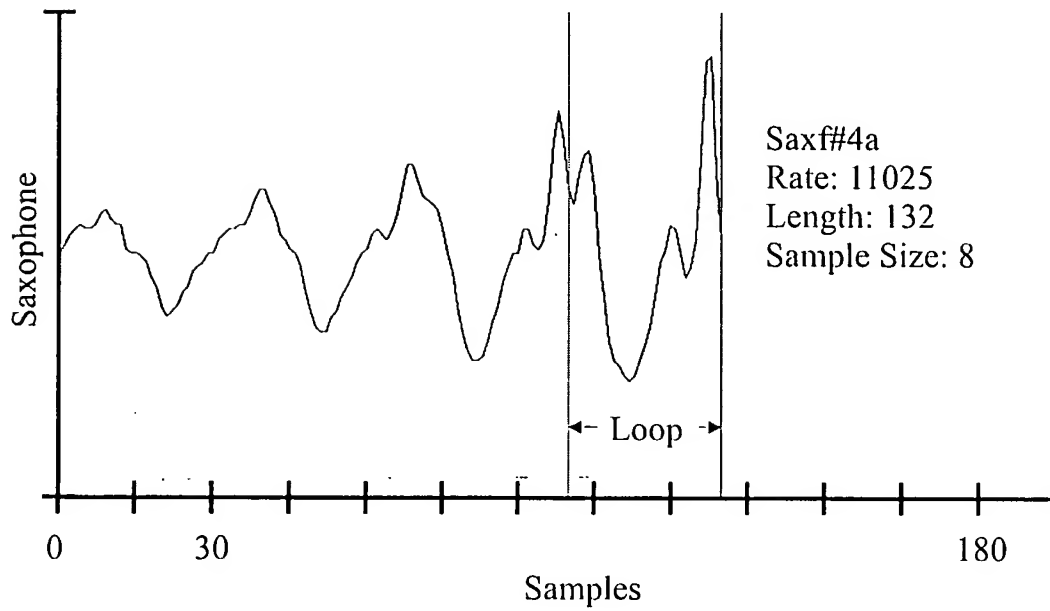


Figure 76
Exemplary Saxophone and
Oboe Sounds